THE GRAY SHEET

Computer Industry

REPORT

International Data Corporation
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IDC — IDC's forecasts of IT opportunities

The U.S. IT Market: Where Does All The Money Go?

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March 1, 1998

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Anyone planning to market and sell IT goods in the United States must ask a seemingly simple question: Will anyone spend money on my product or service? Given the remarkable demand for nearly any fare associated with a computer these days, the simple answer to that question is usually "yes."

However, the simple answer isn't what a senior manager, venture capitalist, or fledgling entrepreneur needs for predicting the success of a prospective product offering. Even in the growing market for IT, bringing a product to market (and keeping products in the market) requires a keen understanding of buyer preferences, corporate purchasing trends, purchasing authority, and other dynamics occurring within the walls of businesses.

Fortunately, IDC conducts its most exhaustive research survey to pinpoint the trends and dynamics behind IT purchasing decisions. The *Global IT Survey* fields responses from IS department managers and top executives to questions about current and anticipated spending habits for IT products and services.

The 1998 results (containing yearend data for 1997) for the United States are in, and they hold a few surprises. This double issue of *The Gray Sheet* presents the findings from this year's *Global IT Survey* as they pertain to spending patterns in general and Internet spending in particular. Some surprises are the following:

- IS managers expect their operating budgets to grow 15% on average in 1998, with external spending improving significantly.
- Internet- and Web-based projects receive little credit for influencing IS budgets, but the true effect of these projects occurs "below the surface."
- Most businesses have many of the components necessary for implementing a total Internet commerce solution.
- No vendor yet has achieved dominant mindshare among corporate buyers searching for Internet solutions, although Microsoft was given the most mentions.
- In large and medium-sized sites, Web access is nearing

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Associate Editor
Rick Miller

Production
IDC Publishing Services & Techaplogies

Editorial Advisors
Doug McLeod
Lloyd Cohen John Gantz
David Vellante Gigi Wang
Bruce Stephen Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDC
Patrick J. McGovern

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, PO Box 573, Oxon Hill, MD 20750-0573

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total penetration. However, in small sites, Web access penetration is stalled at about 60%. Small businesses, on the other hand, continue to grow.[1]

Global IT Survey data reflects "computerized" sites in three size classifications.[2] Small sites are defined as having 10–99 employees; medium-sized sites have 100–499 employees, and large sites have 500 employees or more. Data in this newsletter pertains to the United States only.

Note: Data in tables and figures may not be exact due to rounding.

THE TOTAL PACKAGE

A company's total IT spending is the equivalent of its IS department's operating budget plus its IS department's capital budget plus the aggregate spending of any end users or business units that elect to purchase IT products or services from their own budgets.

As shown in Table 1, the average total IT spending at U.S. companies is $308,000.[3] On average, operating budgets make up the largest portion of corporate IT budgets (45%); end-user spending makes up the least (22%). As with many IT spending findings in the *Global IT Survey*, this varies proportionally according to company size (e.g., in small businesses, end-user spending was only 5% of total budgets, whereas it was 38% and 43%, respectively, in medium-sized and large businesses).

Not surprisingly, budgets vary according to company size. On average, large U.S. companies spent nearly $10 million on IT products in 1997.

INSIDE THE IS OPERATING BUDGET

Why is the data in this newsletter focused on IS operating budgets? The *Global IT Survey* defines the operating budget as the following:

A short-term plan for managing the resources necessary to carry out a program. Short term may mean a few weeks to a few years. For IT, this budget includes all internal and external spending, such as hardware, packaged software, external IT services, and personnel, as well as miscellaneous expenses associated with overhead.

1. The *Global IT Survey* polls respondents at the site level, which means the site may be a branch office of a larger business or organization. Sometimes site respondents are asked questions that pertain to the business as a whole (e.g., spending questions). The results of these questions are presented by site size in this document, but the results pertain to businesswide trends. Tables and figures herein are labeled accordingly.

2. Computerized means the sites that responded to the survey had to have at least one working PC used for business functions. Readers may remember that last year's survey included all companies, even those with fewer than 10 employees. IDC removed these companies from last year's data and retabulated the findings to ensure accuracy in year-on-year comparisons.

3. All total averages in this *Gray Sheet* represent weighted averages. Because small businesses and sites comprise the majority of businesses and sites in the United States, response data is weighted to reflect this demographic.

TABLE 1
U.S. AVERAGE TOTAL SPENDING BY BUSINESS SIZE, 1997 ($000)

	Operating Budget	Capital Budget	Business Unit/ End-User Budget	Total Spending	N =
Small sites	78.3	66.8	8.1	153.1	221
Medium-sized sites	682.4	327.1	610.1	1,619.6	218
Large sites	3,543.3	2,050.6	4,179.9	9,773.7	108
Total average	137.7	101.7	68.7	308.0	547

Note: Sites reported spending data at the business level
Source: IDC's *Global IT Survey*, 1998

From an Internet perspective, the IS operating budget is a key indicator for spending patterns because of the logistics involved with establishing Web-based solutions. Previous IDC research indicates staff salaries and consulting constitute the lion's share of expenses associated with Internet solutions. These line-item costs will never appear in an IS department's capital budget. Furthermore, the hardware and software used to create Internet solutions may not cost enough to be amortized in a capital budget.

Although the expenses a company will amortize in a capital budget vary according to respective accounting practices, and although larger businesses may encounter hardware and miscellaneous costs large enough to amortize, IDC believes IS operating budgets are good indicators for spending trends relevant to the Internet market — especially for the fast-growing small and midsize business segments.

The average IS operating budget was $137,700 in 1997. Although this number isn't large enough to pay the IS director at many major companies, one should note that this is a nationwide average number. It includes businesses as small as 10 employees, which obviously would have IS budgets much smaller than those of Fortune 500 companies.

When asked to forecast changes in their operating budgets, respondents in small and medium-sized businesses were optimistic that operating budgets would increase. (In fact, small businesses expect significant changes.) Large businesses anticipate increases, but more moderate than those of their smaller counterparts (see Table 2).

TABLE 2
U.S. IS OPERATING BUDGET BY ESTABLISHMENT SIZE, 1997 AND 1998* ($000)

	1997	N =	1998	N =	1997–1998 Growth (%)
Small sites	78.3	111	87.0	111	17
Medium-sized sites	682.4	123	743.7	123	13
Large sites	3,543.3	61	3860.2	61	13
Total avg.	137.7	295	150.4	295	15

* Estimated growth for 1998 was applied based on data from respondents who gave comparisons for both years.
Notes: Extreme values were excluded from analysis. Sites reported spending data at the business level
Source: IDC's *Global IT Survey*, 1998

Internal Versus External Costs

On average, U.S. businesses spent nearly three-fifths of their IS operating budgets on internal costs in 1997 (see Figure 1). Salaries account for much of the internal expense and will continue to do so. A recently released Computerworld survey revealed that average salaries for IS professionals increased 10% in 1997, and the well-publicized shortage of IS technology professionals should enforce the continued salary growth in the near term.

However, when asked to forecast the split between internal spending and external spending for 1998, respondents across the board indicated internal spending will decrease as a percentage of IS operating budgets. If the estimated increases in total IS operating budgets hold true, and if the percentage of internal spending indeed decreases as a portion of these budgets, 1998 will be a good year for IT vendors because the spending for external goods and services will increase dramatically.

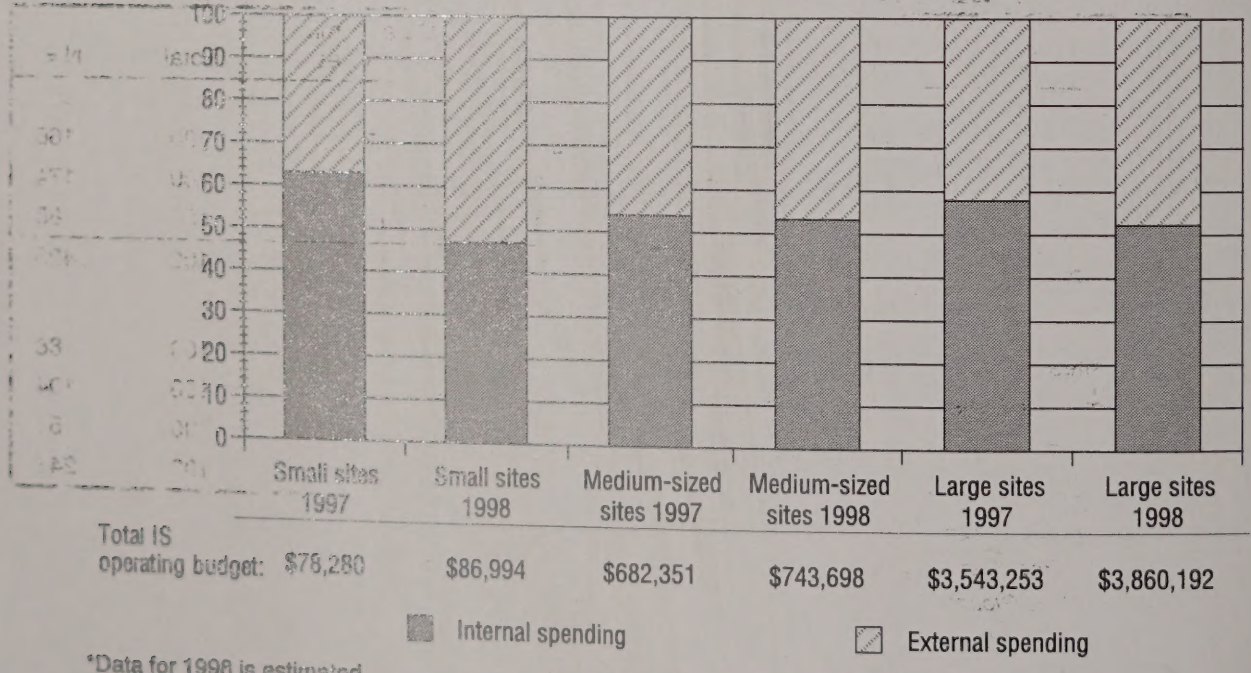
Let's Take It Outside

How are companies spending the money they earmark for external IT products and services? Hardware accounted for most of the IS operational budgets in 1997 and will do so again in 1998, but the other market segments gain share (see Figure 2 and Table 3).

The amount of operating budgets devoted to data communications services underscores the operating budget's relevance to the Internet market. Although data communications services account for only about 5% of overall IT spending (based on other IDC research), they account for three to four times that share of the average IS operational budget.

What priority does the Internet rate as the IS moneys are doled out? Spending on Web-related technologies and services takes about 8% of IS operating budgets and doesn't vary much according to the size of a company (see Table 4). Companies from several industries spend more than the average 8% of IS operating budgets on

Figure 1
U.S. Internal And External Spending In IS Operating Budgets, 1997 And 1998*

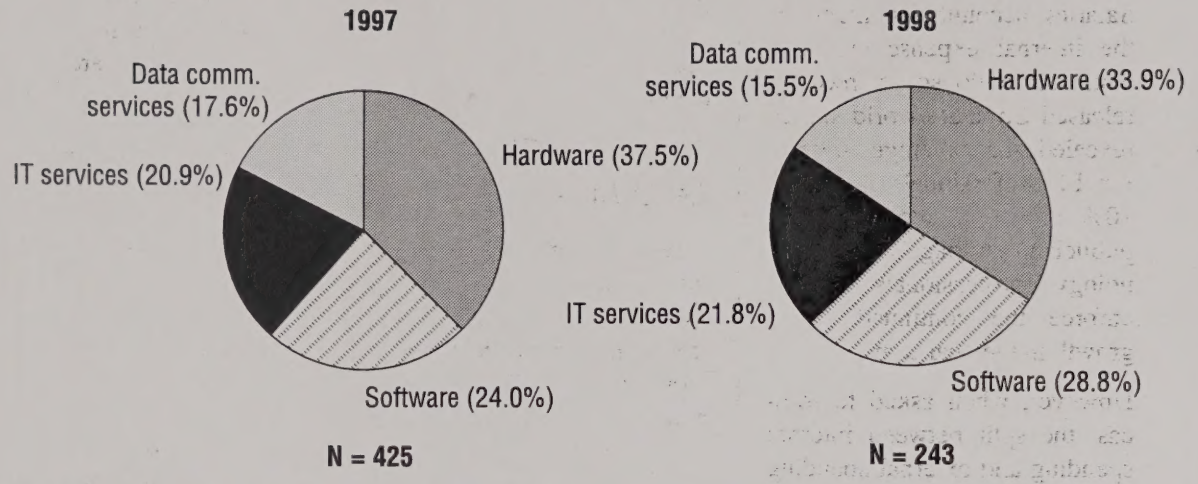


*Data for 1998 is estimated.

Note: Sites reported spending trends at the business level.

Source: IDC's *Global IT Survey*, 1998

FIGURE 2
U.S. TOTAL AVERAGE EXTERNAL IT SPENDING (FROM OPERATING BUDGETS) BY MARKET SEGMENT, 1997 AND 1998*



*Data for 1998 is estimated.
Source: IDC's *Global IT Survey*, 1998

TABLE 3
U.S. EXTERNAL IT SPENDING (FROM OPERATING BUDGETS) BY MARKET SEGMENT AND COMPANY SIZE, 1997 AND 1998* (%)

	Hardware	Software	IT Services	Data Comm. Services	Total	N =
1997						
Small sites	37	24	21	17	100	166
Medium-sized sites	40	20	21	19	100	174
Large sites	35	30	18	17	100	85
Total avg.	37	24	21	18	100	425
1998						
Small sites	33	29	25	13	100	88
Medium-sized sites	38	27	15	20	100	104
Large sites	30	31	24	15	100	51
Total avg.	34	29	22	16	100	243

* Data for 1998 is estimated.
Note: Sites report spending data at the business level.
Source: IDC's *Global IT Survey*, 1998

TABLE 4
U.S. BUSINESS IS OPERATING BUDGETS ALLOCATED FOR WEB SPENDING BY SITE SIZE, 1997

	Portion Of Budget (%)	Mean ($)	N =
Small sites	9.0	7,045	213
Medium-sized sites	6.8	45,479	209
Large sites	7.1	252,218	100
Total avg.	8.0	11,000	522

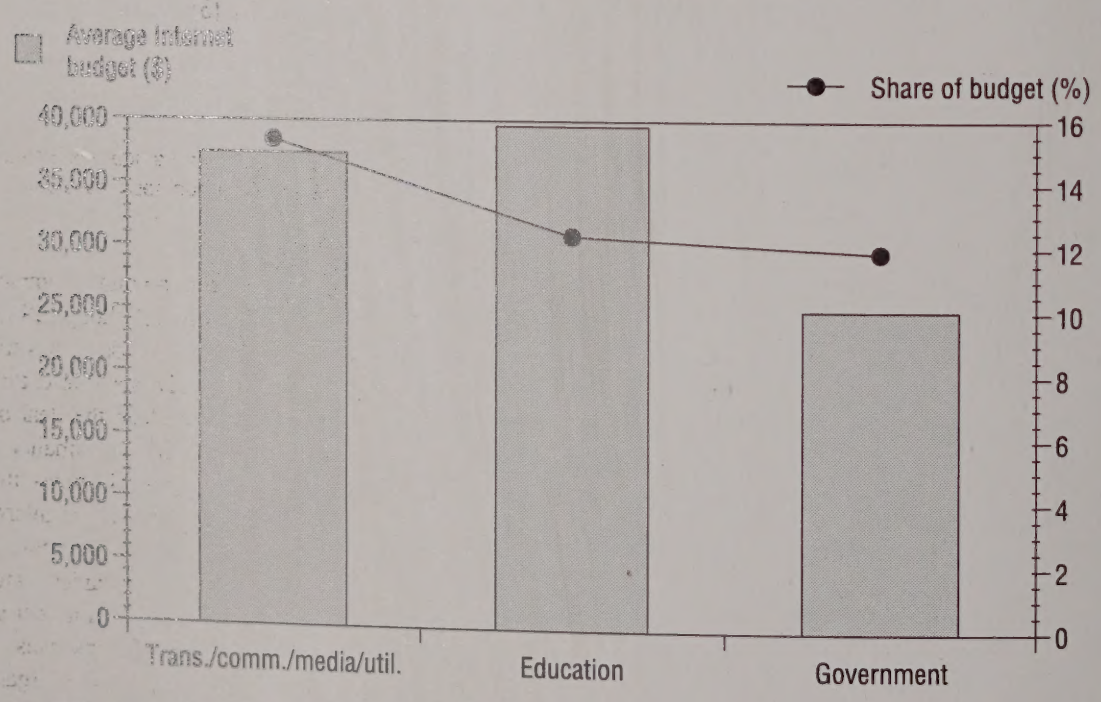
Note: Sites reported spending data at the business level.
Source: IDC's *Global IT Survey*, 1998

Internet products. The transportation/communications/utilities industry segment, the education segment, and the government segment all devote more than 10% of their IT operating budgets to Internet products (see Figure 3).

One may find that 8–10% of an operating budget represents a remarkably low emphasis for adopting Internet technologies in U.S. businesses; however, readers must keep in mind that many of the components of an Internet solution serve multiple purposes. Thus, although workers need PCs as a hardware platform to connect to the Internet, PCs may not count as Internet spending in the eyes of many IS managers because they serve many other purposes beyond Internet connectivity.

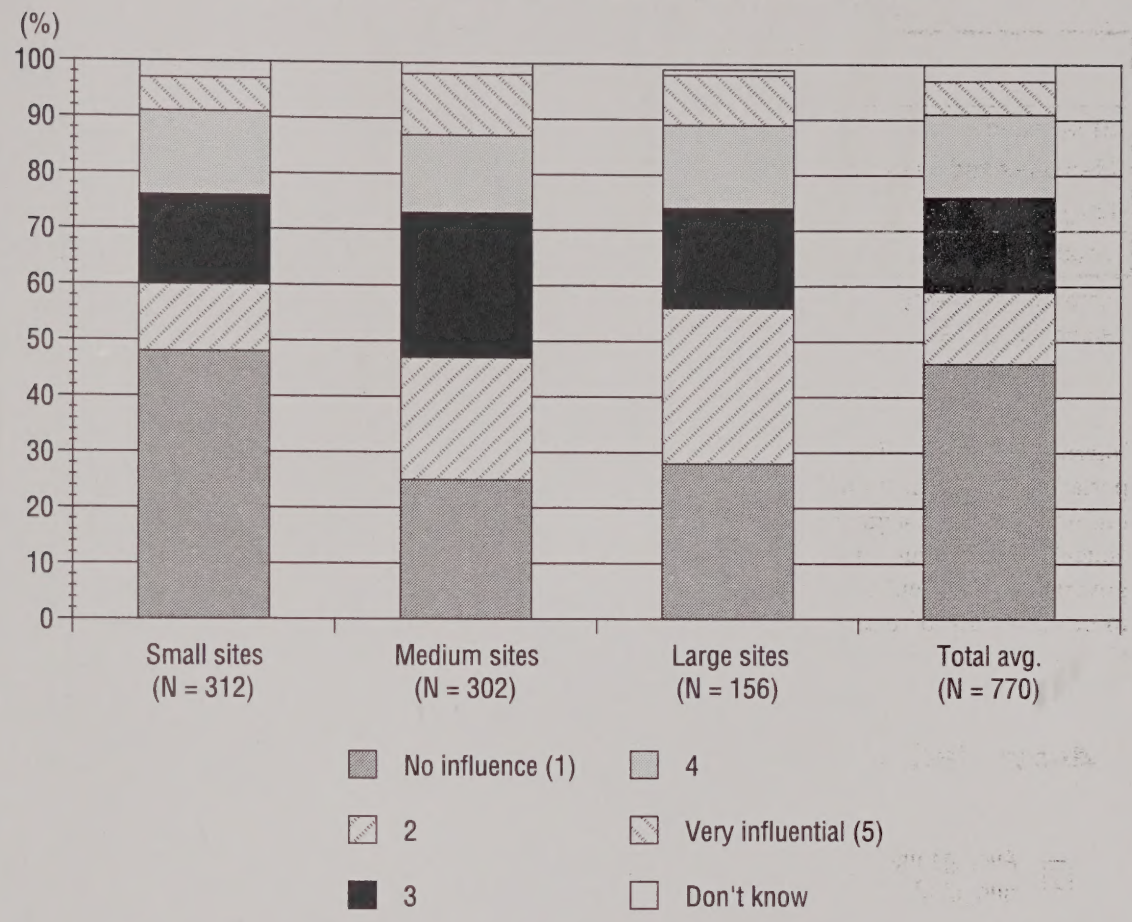
Despite the hype and hysteria the Internet has created in U.S. industry, respondents to the Global IT Survey do not give the Internet much credit for influencing growth in IT operating budgets. When asked to rate how much Internet strategy would affect budget change in 1998 on a scale from one to

FIGURE 3
ABOVE AVERAGE: SEVERAL INDUSTRIES SPEND MORE THAN THE NORM FOR INTERNET GOODS AND SERVICES, 1997



Source: IDC's *Global IT Survey*, 1998

FIGURE 4
HOW STRONGLY DOES INTERNET STRATEGY AFFECT IT OPERATING BUDGETS (1997)?



Notes: Respondents were asked to rate the importance of each of the above factors on a scale of 1 to 5 with regard to the amount of influence they had on IS operating budgets. Sites reported business level data.
Source: IDC's *Global IT Survey,* 1998

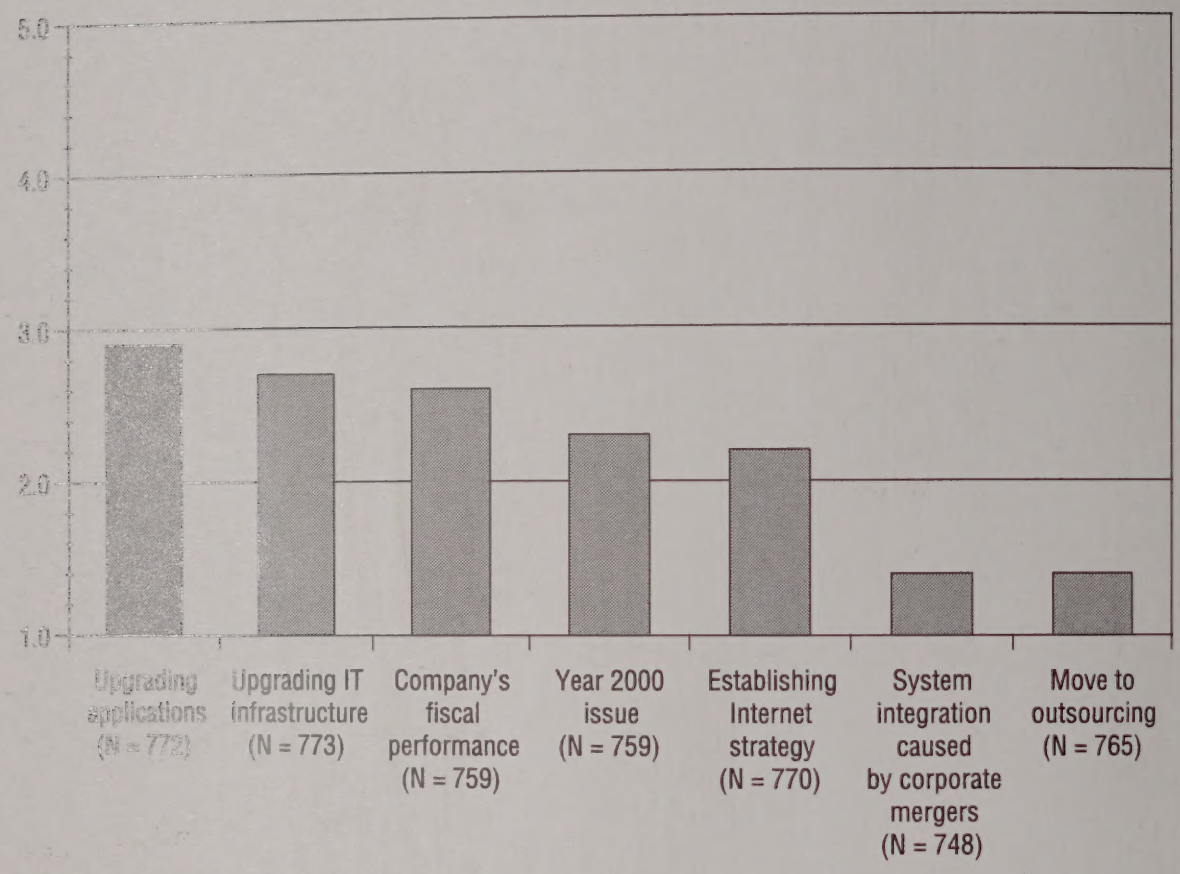
five (with five being the greatest effect and one being the least effect), nearly 60% rated Internet strategy as a two or a one (see Figure 4).

Compared with other factors that influence IT spending, Internet strategy was middle of the road in importance. On average, companies' need to upgrade applications and companies' fiscal performance were greater influences on IS operating budgets than was the Internet (see Figure 5). Responses from small companies differed drastically from their larger counterparts (and served to keep mean scores low) for some of the influence factors, including year 2000 and infrastructure upgrades, but company size was not much of a differentiator regarding the Internet.

WHO HOLDS THE PURSE STRINGS?

For Web vendors, the person responsible for purchasing Internet products is just as important as the amount companies are spending. Although IS managers are the primary buyers, many times CEOs and directors are the ones to close the deal on a sale (especially in smaller companies). This illustrates the strategic importance the Internet plays in corporate decision making. Larger companies are more likely to make Internet spending a matter of consensus, with almost 15% of these organizations involving committees and decision-making teams (see Figure 6 and Table 5).

FIGURE 5
HOW DOES THE INTERNET COMPARE WITH OTHER IS BUDGET INFLUENCES (1997)?


5.0
4.0
3.0
2.0
1.0
Upgrading applications (N = 772)
Upgrading IT infrastructure (N = 773)
Company's fiscal performance (N = 759)
Year 2000 issue (N = 759)
Establishing Internet strategy (N = 770)
System integration caused by corporate mergers (N = 748)
Move to outsourcing (N = 765)

Note: Respondents were asked to rate the importance of each of the above factors on a scale of 1 to 5 with regard to the amount of influence they had on IS operating budgets.
Source: IDC's *Global IT Survey*, 1998

INTERNET-RELATED QUESTIONS

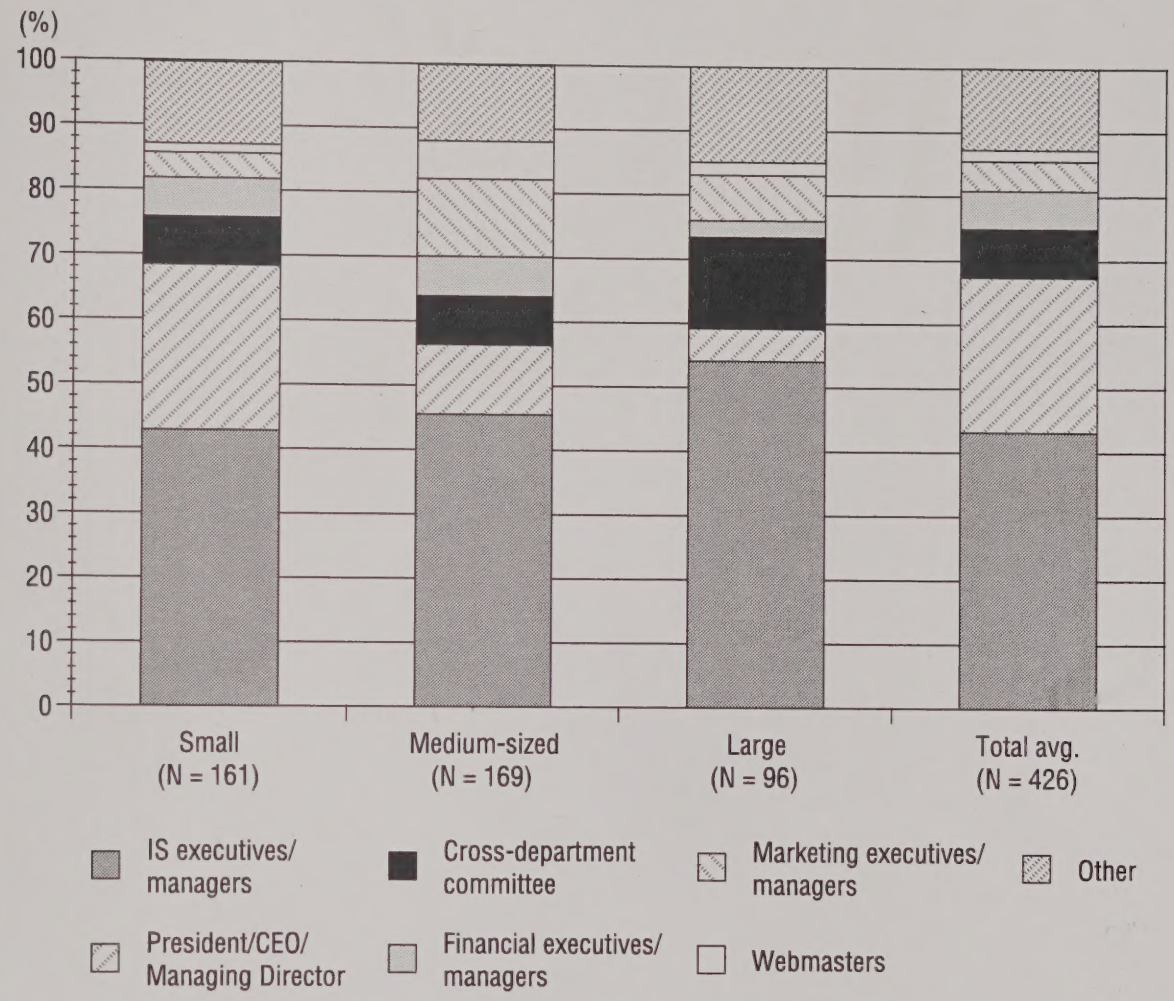
The Global IT Survey queried respondents about several Internet-specific issues.

IDC polled respondents regarding Web access at the site level to determine just how pervasive the Internet is in the U.S. business environment. (Most other Internet questions were asked at the company level rather than the site level because technologies like home pages, intranets, and e-commerce solutions are usually implemented company-wide.)

The first signs that even segments of the Internet industry are subject to maturation appeared in the site data for Web access. Web access among all sites increased less than one percentage point in 1997, with Web access in the small-site segment actually showing a slight decline. Although medium-sized and large sites showed increased Web adoption and are closing in on saturation, the small-site segment has reached plateau before attaining even two-thirds penetration (see Figure 7).

The Global IT Survey includes computerized businesses only, so the pause in small-business Web adoption probably is not due to fear of technology. Rather, this apparent mutation in the findings reveals a peculiar characteristic of the Global IT Survey. IDC found that about 70% of small sites were

FIGURE 6
U.S. BUSINESS EMPLOYEES WHO DECIDE TO BUY INTERNET GOODS AND SERVICES BY SITE SIZE, 1997



Note: Respondents were asked to rate the importance of each of the above factors on a scale of 1 to 5 with regard to the amount of influence they had on IS operating budgets.

Source: IDC's *Global IT Survey,* 1998

standalone businesses, but 30% of small sites were actually branch offices of larger organizations. Given the vast penetration of Web access in larger businesses, it appears this penetration has trickled down to the branch offices — causing high penetration rates in the small-site category, but not in the small business category.

According to IDC/LINK's Small Business Survey, Web access penetration is still growing markedly, and penetration rates are not yet as high as in other company sizes, as Figure 7 shows.

U.S. business adoption of home pages is growing expectedly. A little more than 30% of businesses in the Global IT Survey sample had Internet home pages in 1996; by the end of 1997, about 35% of businesses had a site on the World Wide Web. All three company size segments grew their acceptance of the Internet home page measurably. Large business is the greatest adopter, with more than 70% penetration in 1997 (see Figure 8).

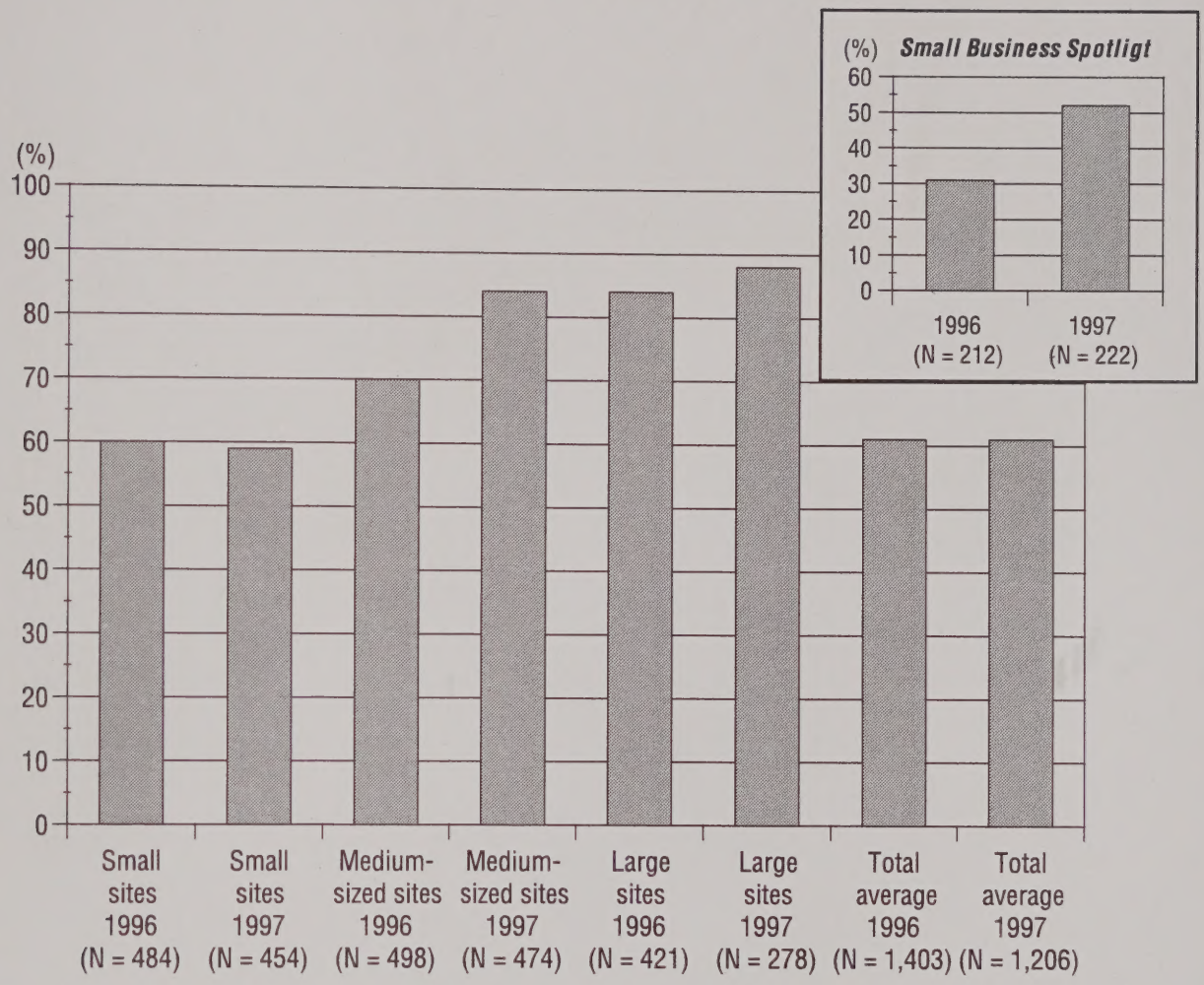
TABLE 5
U.S. BUSINESS EMPLOYEES WHO DECIDE TO BUY INTERNET GOODS AND SERVICES BY INDUSTRY AND TYPE OF RESPONDENT, 1997 (%)

	Banking	Other Finance	Process Mfg.	Discrete Mfg.	Trans./ Comm./ Util.	Retail/ Wholesale	Profes-sional Services	Health Care	Education	Government	Other	Total
IS executives/managers	2.4	43.9	30.6	22.5	37.8	67.5	37.2	53.7	23.6	22.2	50.4	43.2
President/CEO/managing director	22.5	0.0	15.9	31.4	22.7	4.5	22.8	2.5	17.8	9.9	49.6	24.2
Cross-department committee	23.2	32.5	20.1	6.6	7.2	2.8	7.7	2.0	19.2	17.1	0.0	7.5
Financial executives/managers	22.5	0.0	11.6	9.3	8.2	0.6	6.6	30.8	1.0	14.6	0.0	6.0
Marketing executives/managers	26.6	5.5	2.6	16.6	11.3	2.4	12.6	6.1	0.5	0.5	0.0	4.6
Webmasters	1.4	0.0	0.0	0.2	6.5	0.0	6.2	2.1	13.4	2.4	0.0	1.8
Other	1.4	18.1	19.1	13.4	6.2	22.2	7.0	2.9	24.6	33.4	0.0	12.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
N =	15	26	38	57	59	23	65	38	54	48	3	426

Note: Sites report spending data at the business level

Source: IDC's *Global IT Survey*, 1998

FIGURE 7
PENETRATION RATES FOR WORLD WIDE WEB ACCESS BY SITE SIZE, 1996 AND 1997



Note: The data in this chart presents an interesting anomaly — one that is important for vendors to note. In the Global IT Survey, which segments its sample by site size, small sites reported no growth in Web access. IDC believes this is because many small sites are branch offices of larger sites, of which many have Web access and thus are subject to slower penetration rates. Findings of a separate small business survey, which queries only standalone businesses, indicate that Web access penetration still grows.

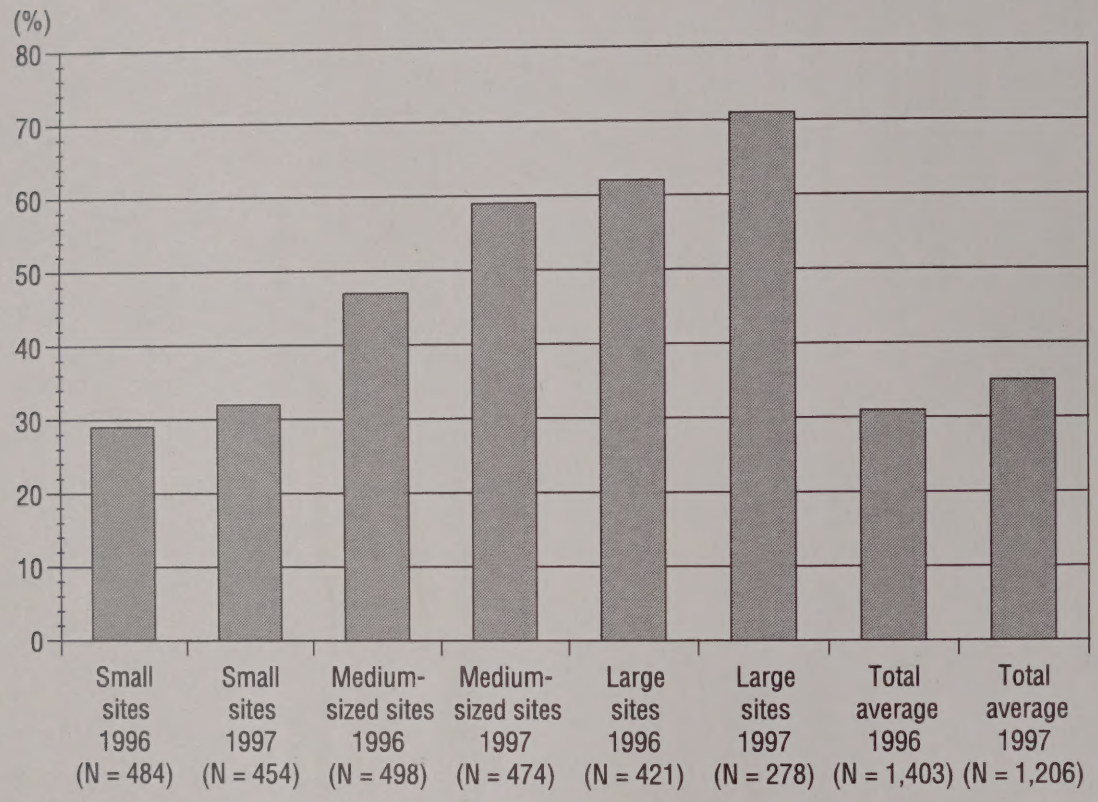
Source: IDC's *Global IT Survey*, 1998 and IDC/LINK's *Small Business Survey*, 1998

Web services vendors may be interested to know that no corporate department dominates the content development for company home pages. Marketing, IS, and unspecified personnel are equally likely to be responsible for generating home-page content. External companies are responsible for content only 8% of the time (see Figure 9).

More companies are assuming the task of hosting their own home pages. The portion of companies that relied on Internet service providers to host their home pages decreased slightly in 1997 (see Figure 10).

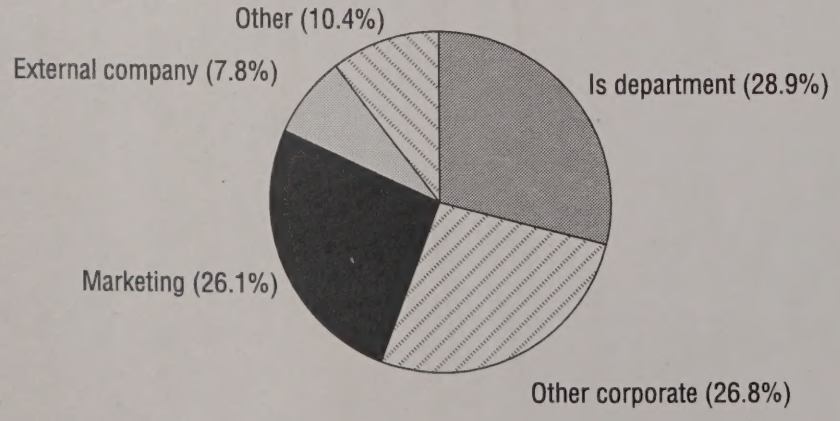
A key dynamic that may influence trends in Web hosting is Internet commerce. The complexity of commerce sites may cause firms without much tech savvy to rely on third-party hosts, or commerce service providers, to handle their electronic commerce solutions;

FIGURE 8
HOME-PAGE PENETRATION IN U.S. COMPANIES, 1996 AND 1997



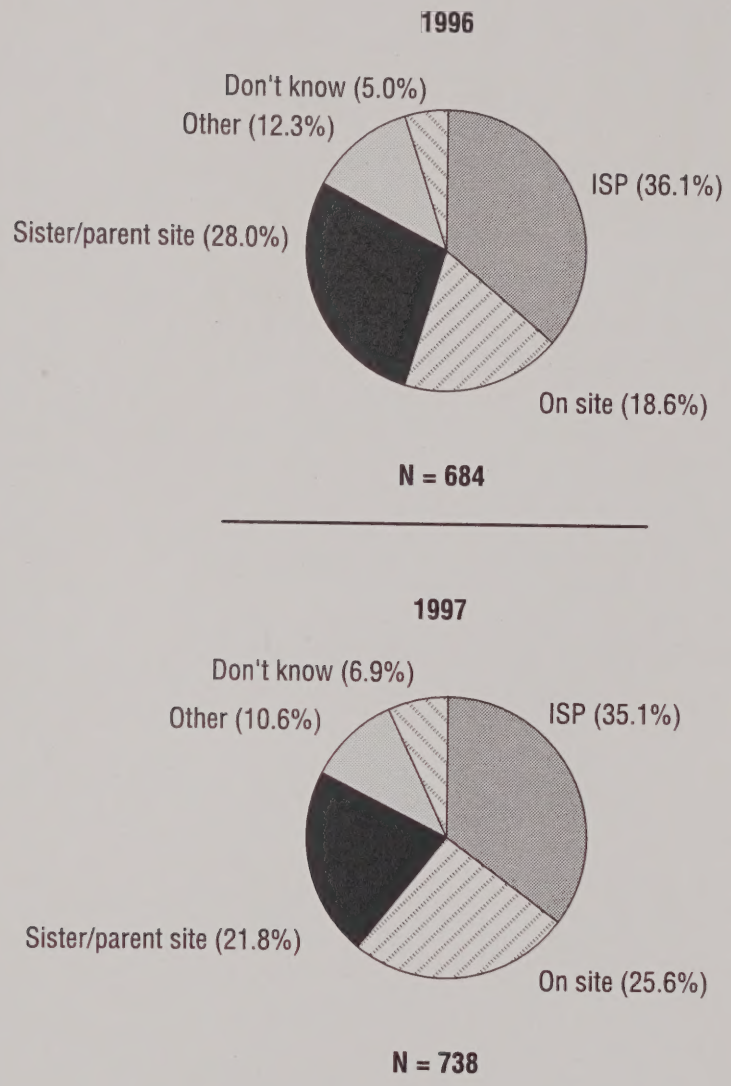
Note: Sites reported home-page trends at the business level, not the site level
Source: IDC's *Global IT Survey*, 1998

FIGURE 9
WHO DEVELOPS CONTENT FOR COMPANY HOME PAGE (1997)?



N = 738
Source: IDC's *Global IT Survey*, 1998

FIGURE 10
WHO HOSTS THE COMPANY HOME PAGE? HOSTING PRACTICES, 1996 AND 1997



Source: IDC's *Global IT Survey*, 1998

however, the sensitive nature of this burgeoning revenue source may force companies to house their own Internet commerce sites.

PREPARATIONS FOR INTERNET COMMERCE

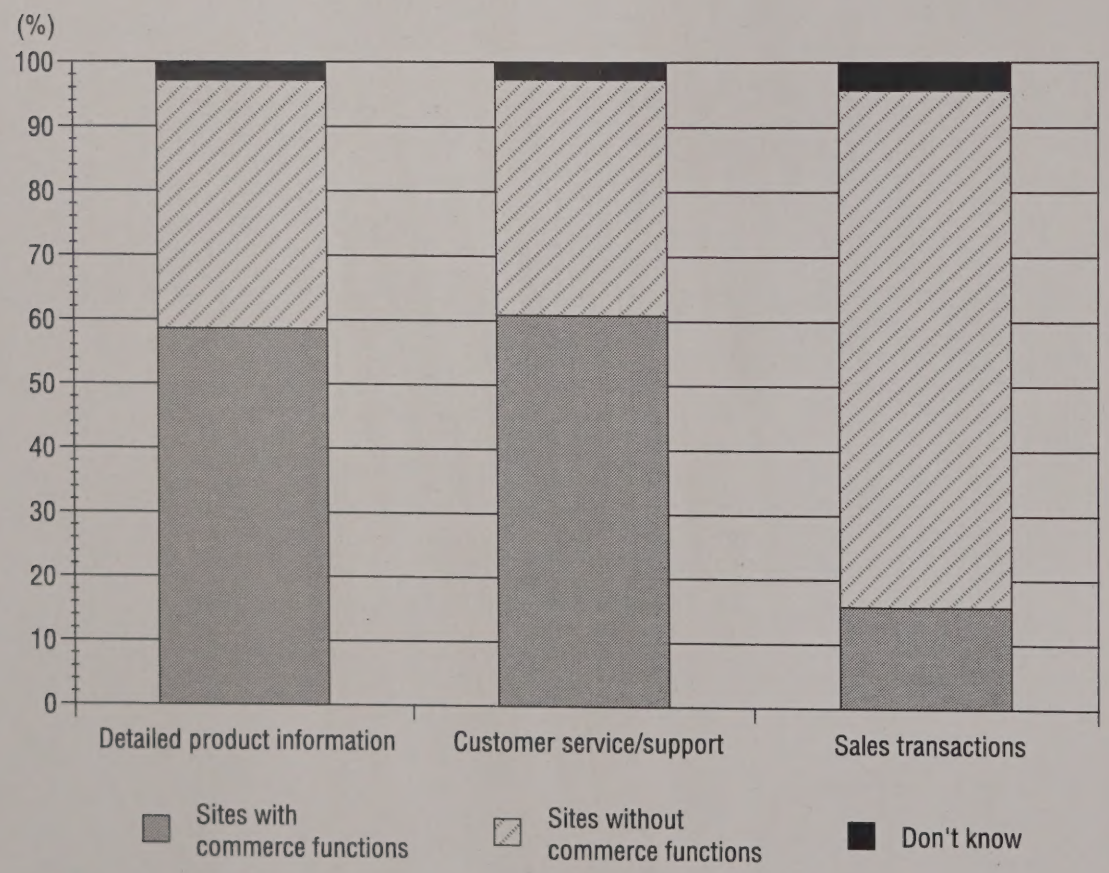
Of companies that have a home page, most are taking the initial steps toward preparing a commerce site, and some already have implemented the capabilities for true Internet commerce. Roughly 60% of all businesses offer detailed product information and customer

service or support on their home pages; about 16% of all companies can handle sales transactions through their home pages (see Figure 11). Size doesn't matter in the market for Internet commerce solutions. Smaller companies and their larger counterparts were equally likely to implement any of the above functions within their sites.

Although Internet commerce is in its earliest stages, some companies are already looking to the next wave of business automation: complete electronic business. E-business, the phrase marketed by IBM and adopted by many other vendors at the recent Internet Commerce Expo in Boston, is the latest jargon for networked business from one end of the supply chain to the other. E-business involves a combination of restricted and unrestricted electronic communication among companies, their customers, and their suppliers. This communication is conducted through the public Internet (to reach customers), semipublic extranets (to reach suppliers), and private intranets (to manage business information within company walls).

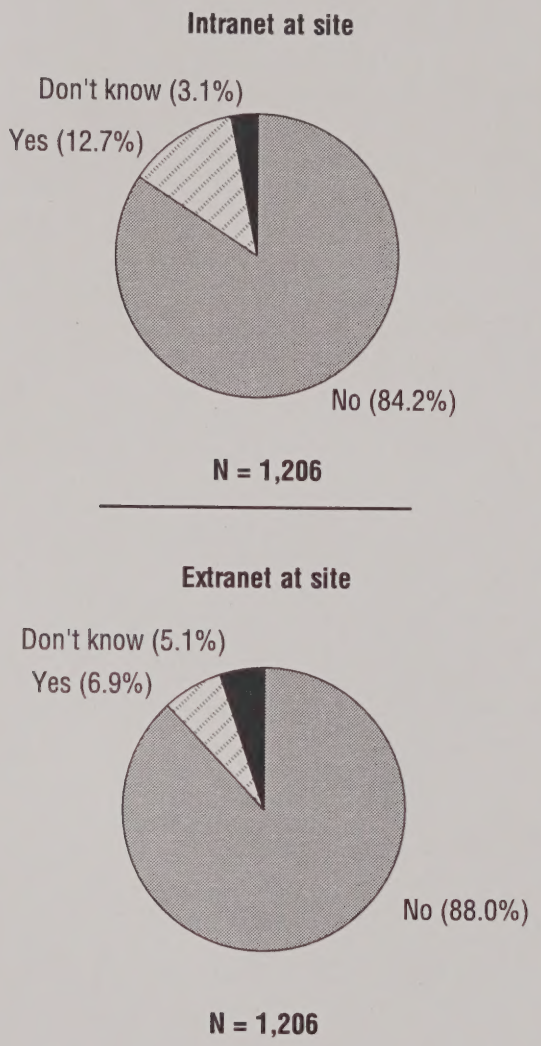
Companies with established intranets and extranets are best positioned to begin e-business, although many companies have implemented these infrastructures already to serve other purposes (see Figure 12).

FIGURE 11
HOW REAL IS INTERNET COMMERCE? PENETRATION OF COMMERCE-RELATED FUNCTIONS ON COMPANY HOME PAGES, 1997



Source: IDC's *Global IT Survey*, 1998

FIGURE 12
AUTOMATING THE SUPPLY CHAIN: PENETRATION OF INTRANETS AND EXTRANETS IN U.S. BUSINESS, 1997



Source: IDC's *Global IT Survey*, 1998

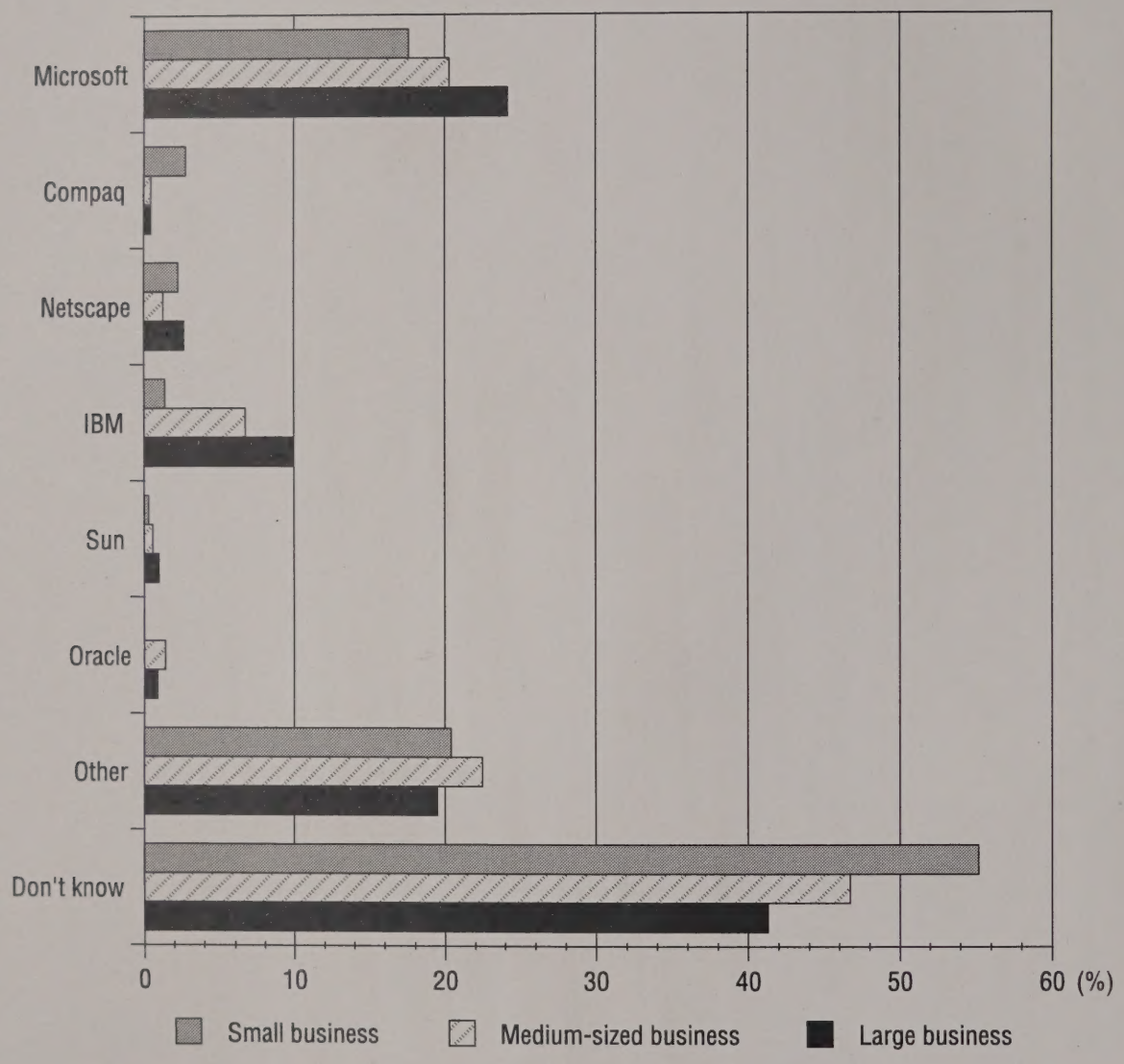
POPULARITY CONTEST: WHO DO IT PROFESSIONALS CHOOSE FOR INTERNET GOODS?

IDC believes that if any IT vendor can dominate the industry in the coming century, it will be the one that masters the Internet market. Given the breadth and diversity the Internet will create, dominating this market may prove to be a fruitless endeavor — but that doesn't mean vendors won't try.

Microsoft enjoys a commanding lead in Internet mindshare in the United States; almost 18% of IS managers named it as most crucial to the success of their Internet and Web-based projects (see Figure 13). Interestingly, Compaq was the next most revered IT vendor (which goes to show the importance of PCs and PC servers in many companies' Internet solutions).

Company size had some effect on the total ratings. Small business responses pulled Microsoft's total average approval rating down several points from the findings gained from medium-sized and large busi-

FIGURE 13
ON WHOM DO IS MANAGERS RELY FOR WORLD WIDE WEB SUCCESS? (BY COMPANY SIZE)



Source: IDC's *Global IT Survey*, 1998

nesses. Despite the mindshare Microsoft has in large and mid-size businesses, its popularity dropped slightly from that expressed by respondents in last year's Global IT Survey.

The most striking piece of data in Figure 13 shows that more than one-half of U.S. business respondents don't know who takes the role of dominant Web vendor. Taking this information into consideration, it's fair to conclude that the battle for the U.S. Internet market is far from won.

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Suspicions Confirmed: Web Commerce Sites Are Yielding Profits

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Feb. 1, 1998

IDC #15518

Vol. 32, No. 22

"The Internet will reduce your sales overhead."

"The Internet will expose your products to new markets."

"The Internet will give you recordable interactive sessions with your customers."

The problem Internet software vendors, Wall Street technical stock investors, and many U.S. and international businesses have with the commonplace advisories above comes down to a simple four-letter word: *will*. The future imperative is getting tiresome.

For more than two years, nearly everyone involved with the IT industry — from vendors to government officials to professional pundits — has waited for real results from the pioneering enterprises that blazed the trail to Web commerce. As Tom Petty has said, "The waiting is the hardest part."

Stock values for Internet companies fluctuated dramatically as investors engaged in tumultuous relationships with start-up outfits that made public debuts with exorbitant IPOs and then went for months without posting profits. Many corporate decision makers helped postpone these profits by electing a wait-and-see strategy for Web commerce — pausing to see results from competitors and peers before making financial investments.

In 1997, however, Web commerce proved to be the uncharted watering hole in the business-strategy jungle. Despite the hazards of lost investments potentially lurking in the underbrush, the thirsty and the fearless finally came to drink.

How have the cybersales swashbucklers fared? Consider the findings:

- The average cost for implementing a Web commerce solution was slightly more than $250,000.
- Nearly one-third of respondents indicated they expected growth rates for Web sales to be greater than 50% in the next year.
- Security has become a nonissue for Web commerce.
- Nearly one-fourth of respondents to a recent IDC survey already are reporting more than $10,000 per month in online sales. A significant number of

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Associate Editor
Rick Miller

Production
IDC Publishing Services & Technologies

Editorial Advisers
Doug McLeod
Lloyd Cohen — John Gantz
David Vellante — Gigi Wang
Bruce Stephen — Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, PO Box 573,
Oxon Hill, MD 20750-0573

■

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respondents refused to quantify their revenue.

This data and other findings from IDC's *1997 Web Sellers Survey* indicate that Internet commerce and Web commerce are beginning to turn real results. Total worldwide Web commerce revenue was $12 billion in 1997; more than $7 billion of that number came from transactions completed directly on the World Wide Web. The revenue from Web transactions will *triple* in 1998, to more than $21 billion.

Needless to say, this is good news for Internet merchants. This issue of *The Gray Sheet* will examine the attitudes, expectations, and results that U.S. Web sellers have and have not achieved. More detailed analysis is available in the recently released IDC report, *The Web Sellers Speak* (IDC #14989, December 1997).

WEB COMMERCE: WHAT DOES IT TAKE?

The primary question for all executives considering implementing a Web commerce solution is, What is my return on investment? To find return on investment (ROI), an executive needs to know the "R" and the "I". Given the early stage of Web commerce, both of these values can fluctuate significantly depending on the size of the organization involved and the technical expectations for the commerce site.

The respondents in IDC's *Web Sellers Survey* hailed from very small companies (fewer than 50 employees) to very large companies (more than 1,000 employees). Their reported expenditures on Web commerce solutions varied dramatically. U.S. Web sellers reported launch costs ranging from sub-$1,000 (seemingly not feasible) to more than $2 million (somewhat exorbitant).

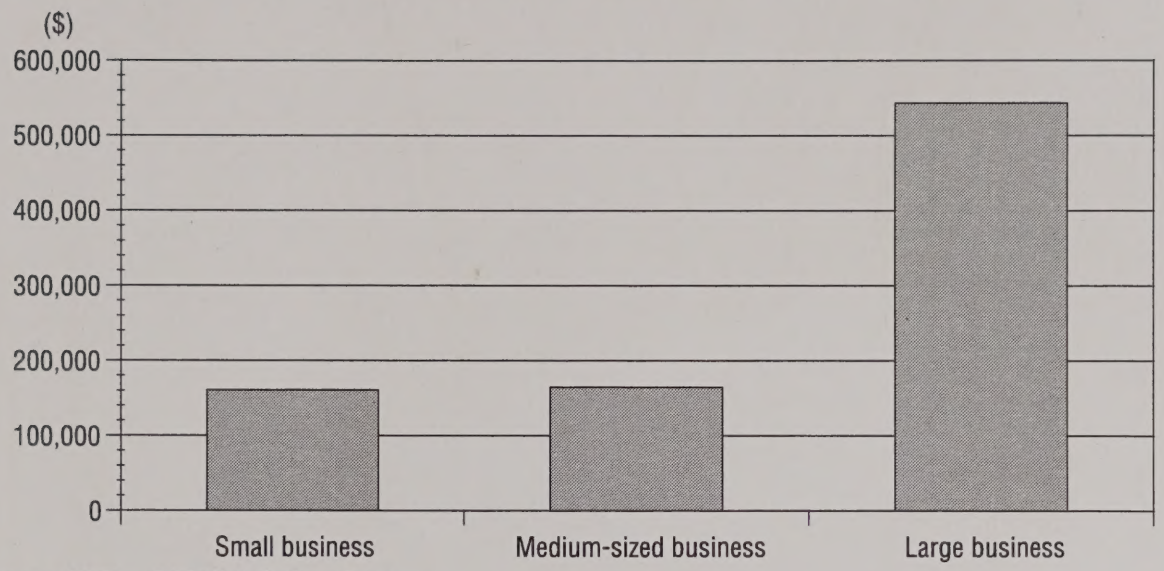
The average cost to launch a Web commerce site was $256,532, based on answers from all respondents. This number fluctuated according to company size: large sites spent more than $500,000 on average (see Figure 1). Small and midsized sites spent roughly the same on their investments on average ($160,000).

That small sites spent almost as much on their Web commerce sites as did their midsized counterparts indicates the increased emphasis small businesses place on doing business on the Web.

Personnel accounts for the largest expense associated with launching a Web commerce site. Existing and added personnel accounted for 38% of launch costs; consulting, an expense similar to adding or promoting internal personnel, accounted for 26%. Hardware and software expenses were less than the required investment in skill and talent (see Figure 2).

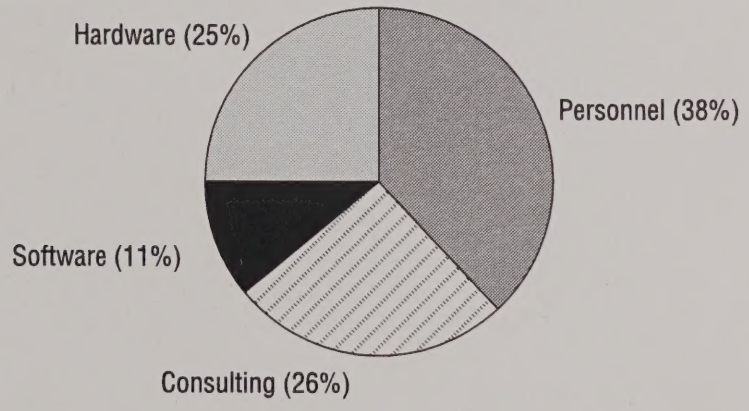
The breakout of launch expenses may be misleading, however, because many organizations use existing hardware and software platforms for hosting their Web commerce sites. Presumably, companies that must buy all new IT equipment to host their commerce sites will have more

FIGURE 1
AVERAGE COST FOR U.S. WEB SELLERS TO LAUNCH COMMERCE SITE BY COMPANY SIZE, 1997



Source: IDC's *1997 Web Sellers Survey*

FIGURE 2
WEB SELLERS' PROJECT COST BREAKOUT, 1997



N = 50

Source: IDC's *1997 Web Sellers Survey*

equal ratios of personnel-to-equipment spending.

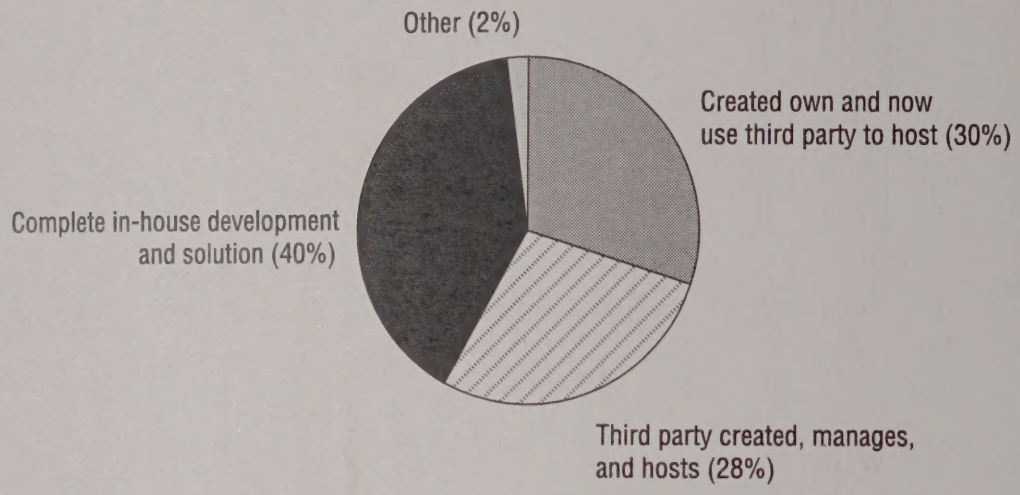
Some companies beat the investment rap by outsourcing the entire site development and hosting process, and some companies cut costs by outsourcing the hosting service only. Figure 3 shows the breakdown for outsourcing Web commerce activities. Company size plays a factor in the ratio of in-house development versus outsourced development. Fifty percent of large companies kept all Web commerce activities in-house. Less than one-third of small companies did likewise.

WHAT DOES WEB COMMERCE GIVE BACK?

After all this investment, what can companies expect in return?

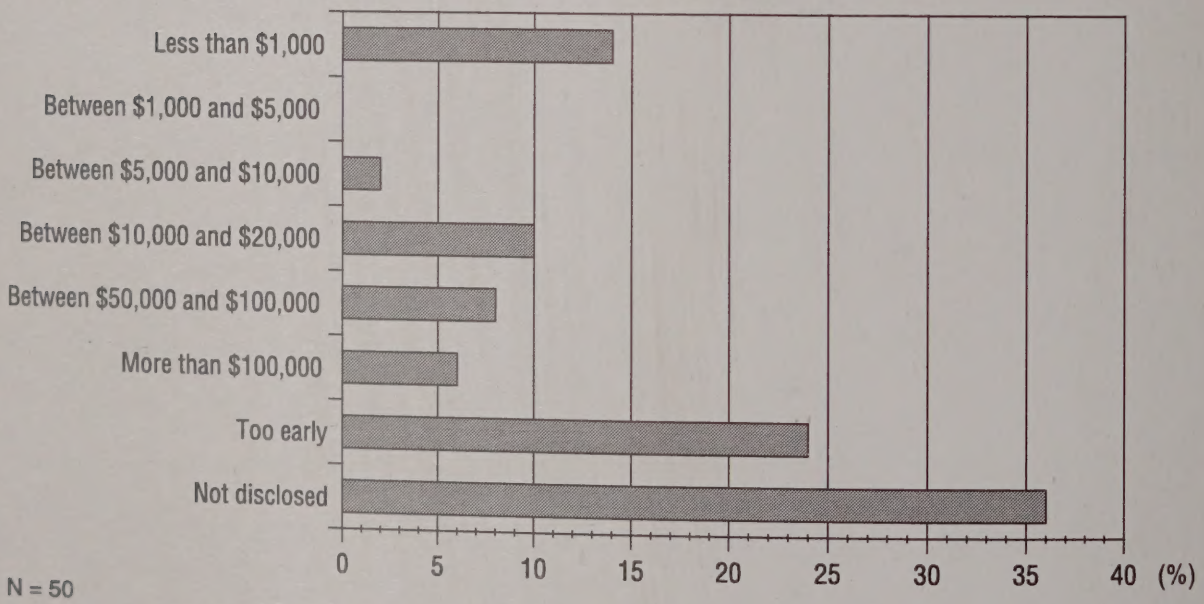
Nearly one-fourth of respondents said it was too early to

FIGURE 3
WHO BUILDS AND MAINTAINS WEB SELLERS' SITES, 1997


Other (2%)
Created own and now use third party to host (30%)
Complete in-house development and solution (40%)
Third party created, manages, and hosts (28%)

N = 50
Source: IDC's *1997 Web Sellers Survey*

FIGURE 4
CURRENT WEB SALES REVENUE RESULTS, 1997



N = 50
Source: IDC's *1997 Web Sellers Survey*

give accurate results from their Web commerce investment, and 36% refused to disclose the information for proprietary reasons. Still, the respondents who would talk offered encouraging news. About one-fourth of respondents earned $10,000 per month or more from Web commerce sales. A fortunate 6% earned more than $100,000 per month. On the lesser end of the spectrum, 14% of respondents earned $1,000 per month or less from their Web commerce sites (see Figure 4).

The X factor in these findings is the respondents who would not reveal their Web commerce revenue. The media and popular press eagerly have promoted success stories from the likes of Dell Computer, which scored $6 million dollars in e-business each day during the holiday season (1997) and forecasts its annual online sales at $1 billion yearly. U.S. icon The Walt Disney Co. also reported tremendous success with online sales. During the holiday season its online commerce site yielded the equivalent revenue of five brick-and-mortar stores. It is likely that many other companies are yielding strong results, but are not revealing their figures because of competitive concerns.

Hard goods was the leading product category in Web sales according to *Web Sellers Survey* respondents. However, software, text products, and intellectual property — all products or services that can be delivered directly through the Web — combined for more share of Web commerce than the hard goods category alone (see Figure 5). This disclosure substantiates previous *Gray Sheet* theories that the information commerce industry will be changed dramatically by the development of the Internet, and information commerce companies that take advantage of this platform can shift the power within their respective markets.

GREAT EXPECTATIONS

Web sellers expect significant growth in revenue from their commerce sites within the next year. Although 24% of respondents felt it was too early to forecast revenue expectations, 30% expected at least a 50% increase in revenue during the next 12 months (see Figure 6). An additional 10% indicated greater than 10% growth in the coming year. Again, the X factor was the sample of respondents who would not reveal the rate at which they expect Web commerce to grow at their organizations.

Based on our *Web Commerce Market Model*, IDC expects the worldwide revenue from sales completed directly on the World Wide Web to triple in 1998 (to $21 billion). This figure bodes extremely well for U.S. Web sellers, for much of the growth in 1998 will occur in the United States, and U.S. merchants are poised to take advantage of foreign growth as well.

Surprisingly, members of the survey sample did not report security as an issue to prevent them from doing business on the Web. Although the popular press may occasionally point to security issues as a hindrance to Web commerce, Web sellers are not encountering consumer resistance because of security. In business-to-consumer Web commerce, most sites and credit cards offer the consumer liability insurance against fraud. Ironically, Web sellers have more to fear in the business-to-business commerce space, where no insurance is available.

OBJECTIVES AND GOALS

WEB COMMERCE TO SUPPORT, NOT SUPPLANT

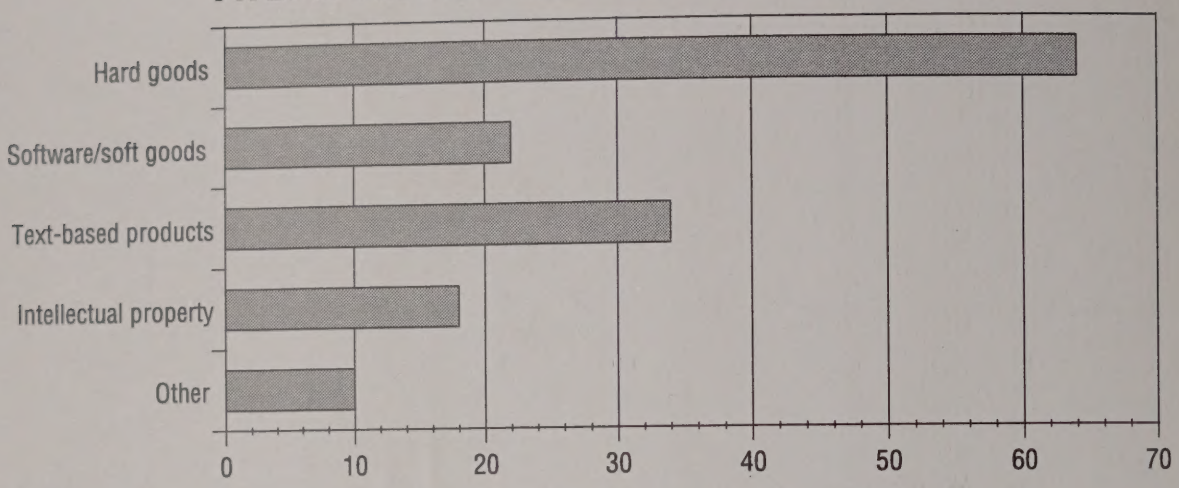
Superficially, the ROI for Web commerce sites is calculated by subtracting the cost to launch and maintain the site from the revenue the site generates. Many times, the real return goes beyond the bottom line. Good Web commerce sites provide marketing and customer support functions that are difficult to quantify.

Respondents to the *Web Sellers Survey* put the multifaceted benefits of Web commerce sites in perspective. Although more than 40% of respondents saw their Web commerce sites as a new sales channel, 50% also saw the Web as a good growth tool for their business — meaning it aided in brand recognition, offered a venue for customer feedback, and produced marketing value that generated business through other channels if not directly through the Internet (see Figure 7).

A significant percentage of respondents (8%) viewed Web commerce sites as a good testing medium for new products.

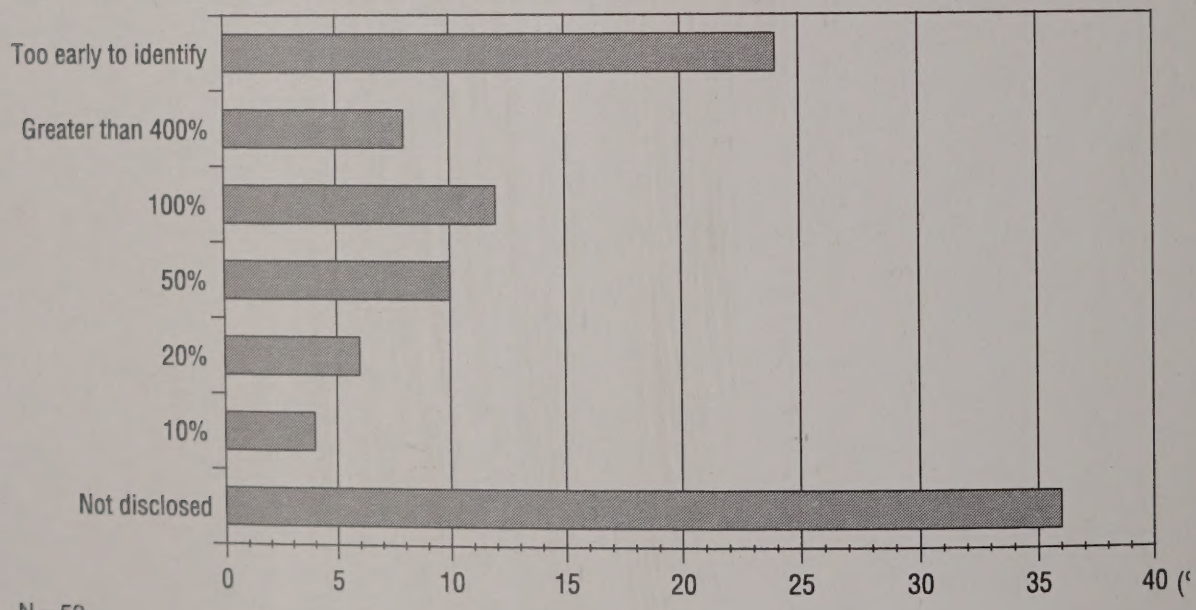
Respondents split evenly regarding the importance of

FIGURE 5
TYPES OF PRODUCTS SOLD FROM WEB SITES, 1997



N = 50
Source: IDC's *1997 Web Sellers Survey*

FIGURE 6
PROJECTED WEB REVENUE GROWTH OVER THE NEXT 12 MONTHS, 1997



N = 50
Source: IDC's *1997 Web Sellers Survey*

electronic commerce. One-third of them rated electronic commerce very important, one-third rated it of medium importance, and one-third rated it of low importance. Small businesses were most likely to rate Web commerce as highly important.

Small business reiterates its love affair with Web commerce by embracing it as a core business. Of the one-fourth of survey respondents who said Web commerce was their core company business, 70% were from small businesses (see Figure 8).

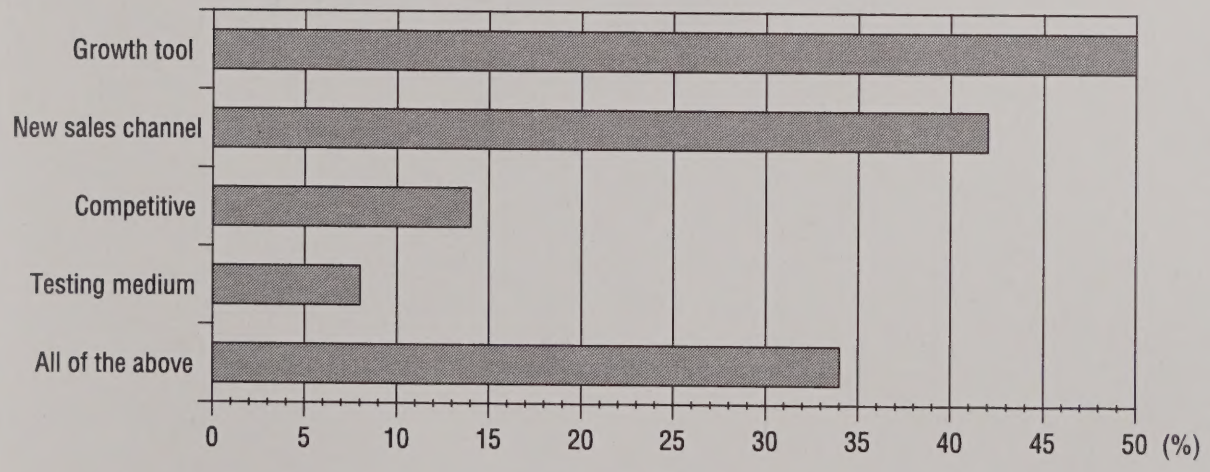
The three-fourths of respondents who indicate that Web commerce is an extension of traditional business bolster IDC's opinion that the Internet will support, not supplant, traditional business models. Although a handful of Web sellers will exist (and thrive) only in the virtual world — Amazon.com, for example — the overwhelming majority of Web players will be well known analog players who successfully complement their brick-and-mortar business with a digital storefront.

THE WEB SELLERS' FUTURE

What will the Web sellers be saying at this time next year? Whatever it is, they'll probably be smiling.

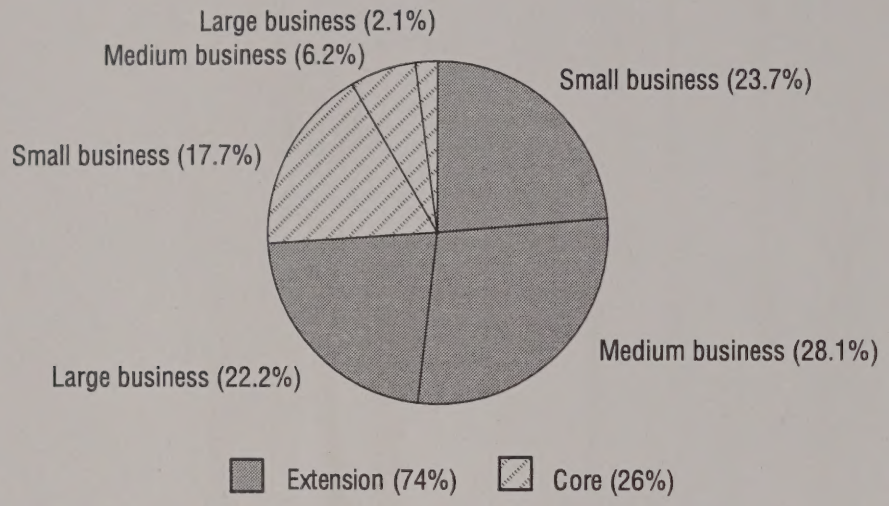
Although the landscape of the Web commerce market will change throughout IDC's forecast period (through 2002), the future for all types of Web commerce is encouraging. As Figure 9 shows, Web commerce is headed in only one direction, and that is up.

FIGURE 7
WEB SELLERS' GOALS OF ONLINE COMMERCE, 1997



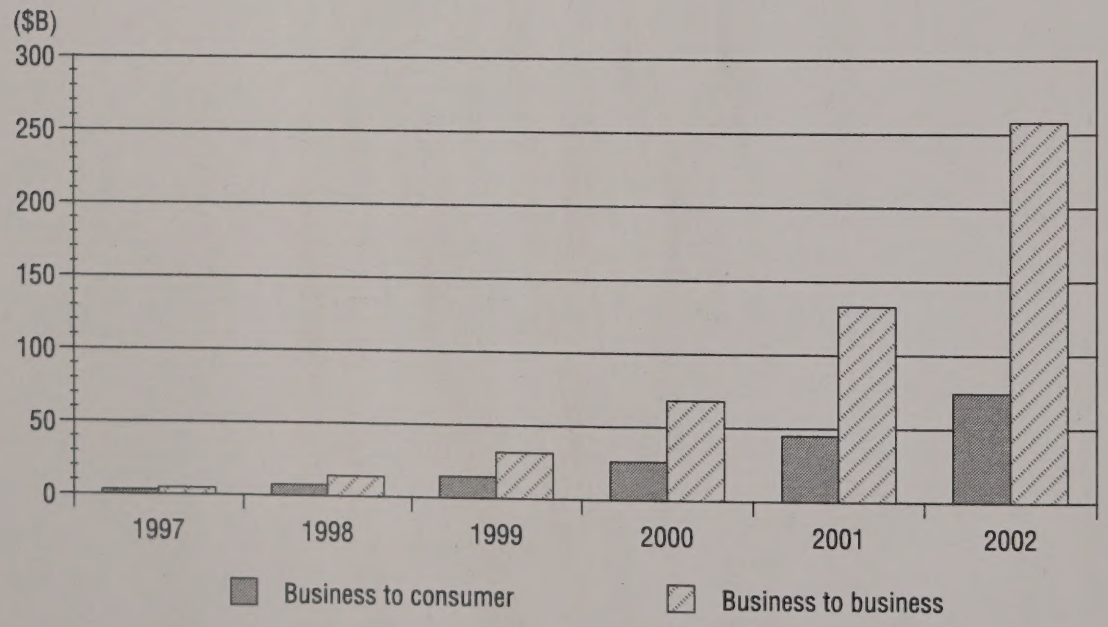
N = 50
Source: IDC's *1997 Web Sellers Survey*

FIGURE 8
WEB SELLING AS CORE BUSINESS VS. EXTENSION OF OTHER BUSINESS, 1997



N = 50
Source: IDC's *1997 Web Sellers Survey*

FIGURE 9
AVERAGE AMOUNT OF INTERNET COMMERCE CONDUCTED ENTIRELY ON THE WORLD WIDE WEB (CONSUMER VS. BUSINESS), 1997–2002



Source: IDC's *1997 Web Sellers Survey*

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THE GRAY SHEET

IDC — IDC's forecasts of IT opportunities

Internet Insights: A *Large* World After All?

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January 15, 1998

IDC #15320

Vol. 32, No. 21

In the glow of the IDC home page, researchers and industry understudies can find Predictions '98: IDC's response to the plethora of prognosticators that use January 1 as a reason to raise portents for the year ahead. Predictions '98, from the Executive Insights service (free at **www.idc.com**), offers IDC's top-ten list for expected happenings in 1998 — happenings with the potential to shift market power in the IT industry.

What gives IDC's predictions more substance than a carnival soothsayer peering into the crystal? The results come from IDC's most exhaustive surveys; the data, if not strikingly surprising, is at the least very encouraging. Consider the following:

- Nearly 100 million people worldwide will surf the World Wide Web on a regular basis in 1998. This number exceeds previous IDC forecasts significantly. More than 100 million people will use the Internet in some form or fashion, even if they don't use the World Wide Web.
- More than $30 billion of commerce will happen directly on the World Wide Web in 1998, and that number will continue to grow dramatically.
- In the United States, the World Wide Web will approach mass market proportions (25% of households) in 1998.
- The high-speed Internet access battle will heat up on consumer and business fronts as xDSL begins appearing in homes.
- ISPs will become the focal point of the Internet industry and IT in general, buying vast amounts of networking equipment and creating a frenzy of strategic mergers.

What do these general predictions mean for specific market segments? The balance of power will shift from the hardware suppliers to the pipeline suppliers: ISPs and telephone companies. While hardware suppliers (specifically PC makers) participate in the bloodbath that is the low-cost PC/Internet access device business, ISPs and telcos will be expanding their services and reaping the benefits of the growing volume of users.

ISPs and telcos benefit not only from increases in user volume but from the power to siphon off revenue from the big prize: Internet commerce. ISPs and telcos that offer Internet commerce services (i.e., provide commerce

THE GRAY SHEET
Associate Editor
Rick Miller

Production
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Doug McLeod
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President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, PO Box 573, Oxon Hill, MD 20750-0573

■

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sites for companies that can't/won't do it themselves) can position themselves to take a cut of the revenue. This strategy works best with smaller companies, and the small business segment of Internet commerce is growing fastest through 2001.

Look for ISPs also to begin exerting an influence on the look and feel of the Internet as ISP home pages become the gateway to the World Wide Web for an increasing number of users.

The Gray Sheet bases its predictions on survey data from several sources: IDC's *Internet Commerce Market Model*, IDC/LINK's *U.S. Consumer Internet and Online Service Forecast*, and the forthcoming report, *DSL Technologies: 1997 Market Assessment and Forecast.* reseller

This week's *Gray Sheet* takes a closer look at some of the predictions that, if true, will have direct impact on Internet market players of all types. How drastically will changes take place and how much money will be at stake? The charts and analysis on the following pages will paint a clearer picture and flip a few tarot cards for some key industry players.

JUST HOW BIG WILL THIS THING GET?

The Internet and its fraternal twin, the World Wide Web, are growing quickly and at a rate that exceeds previous IDC forecasts. In 1998, 110 million people worldwide will use the Internet at work and/or at home. More than 97 million people will use the World Wide Web that same year.* The number of users for these technologies will more than double from 1998 to 2001, and the World Wide Web's graphical interface will approach synonymy with the Internet (see Figure 1).

** Note: Forecast numbers account for overlap between work and home. Users who use the Internet in multiple locations are counted only once.*

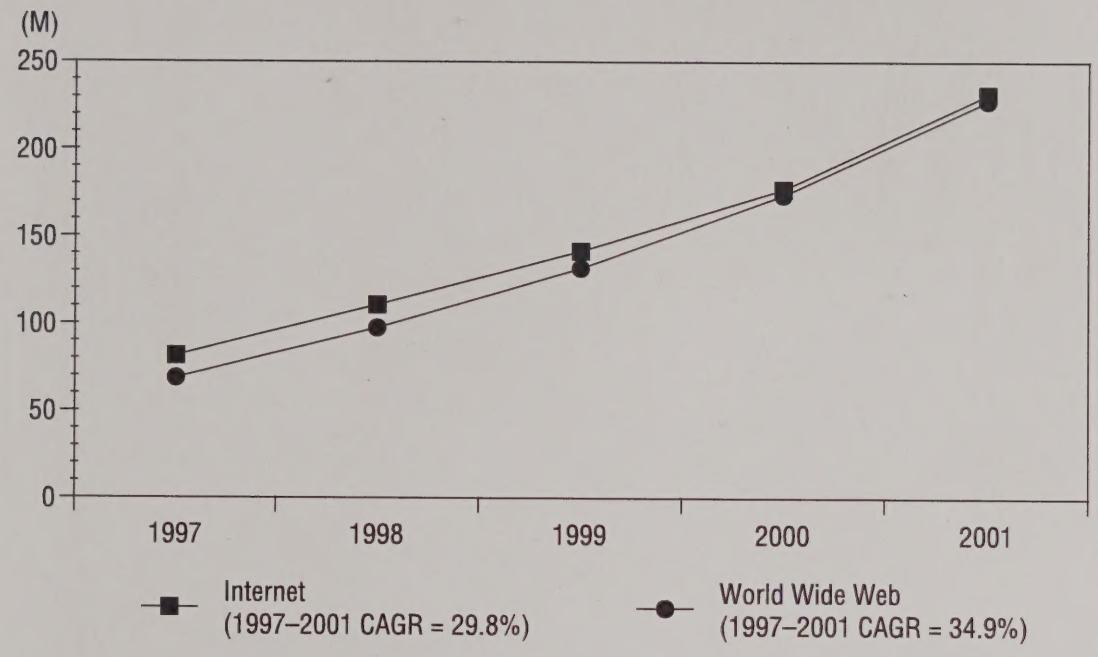
The number of home users for the Internet and World Wide Web will grow at a little more than 36% each from 1997–2001. Small businesses also exhibit strong growth in users; Internet users will increase 34% year on year through 2001, and World Wide Web users will increase 48% for the same period.* Presumably, smaller businesses that now use the 'Net for only e-mail and other non-graphical forms of communication will begin to implement browser-oriented communications solutions.

** Note: These growth rates do not account for overlap. Some users who start using the Internet at home during the forecast period will also begin using it at work.*

The amount of commerce on the Internet increases more rapidly than the number of users. In 1998, $32 billion of commerce will take place on the Internet. More than $21 billion of commerce will be directly on the World Wide Web. The amount of Internet commerce will nearly double each year through 2001, when $237 billion will change hands via the Internet (see Figure 2). In 2001, $176 billion will be exchanged directly over the World Wide Web.

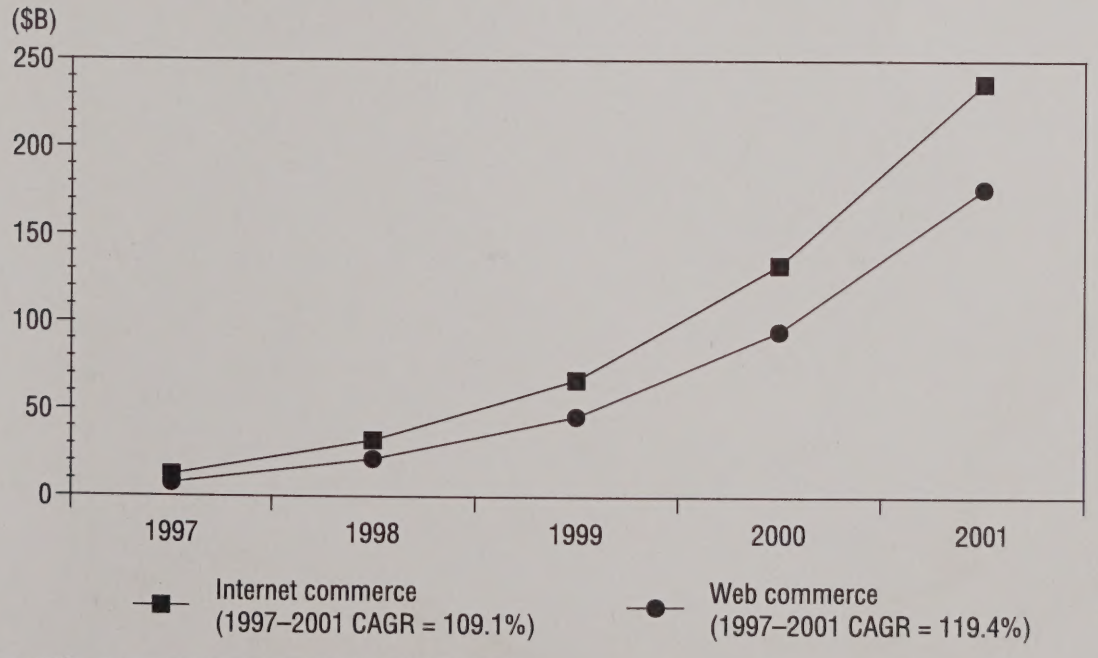
The percentage of Internet sales taking place directly through the World Wide Web (i.e., through secure transactions placed at Web sites) is increasing steadily. In 1997, 62% of Internet sales took place on the World Wide Web; that percentage will increase to 66% in 1998 and 75%

FIGURE 1
WORLDWIDE GROWTH IN USERS OF THE INTERNET AND WORLD WIDE WEB, 1997–2001



Source: IDC's *Internet Commerce Market Model*, 1998

FIGURE 2
WORLDWIDE GROWTH IN INTERNET AND DIRECT-TO-WEB COMMERCE, 1997–2001



Source: IDC's *Internet Commerce Market Model*, 1998

in 2001. Consumers will increasingly desire the instantaneous fulfillment of Internet commerce that Web transactions provide, and business-to-business commerce will demand automation of the sales process as the forecast period progresses.

Currently, more than 40% of Internet commerce takes place from the home. The home segment will not be as dominant in 2001, when only 25% of commerce will be conducted there (even though raw numbers are still increasing). The small business segment makes the biggest gains in share of commerce. It accounts for 12% of dollars changing hands in 1997 but will account for nearly 21% of Internet commerce in 2001. The largest commerce segment in 2001 will be large business (39%, see Table 1).

Going Mainstream: The Internet and the U.S. Mass Market

The forces responsible for making the World Wide Web a mass-market industry in the United States are coming together. In 1997 PC penetration in the home increased nearly four points to 43%. By yearend 1998, PC penetration will be closer to 46% of U.S. households.

Modems are standard issue with virtually all new consumer PCs, and as owners upgrade older PCs, modem penetration will increase substantially. By yearend 1998, about 35% of all U.S. households (80% of homes with PCs) will have modems (see Figure 3).

The percentage of homes with modems creeps toward 50% by the end of the forecast, which means that approximately 50 million households will have the ability (and with the right incentive, the desire) to be part of the information society in the United States.

What Does This Growth Mean?

To players in the old media and the new, the numbers in this forecast bring startling implications. For old-media types, the message is simple: companies that want to maintain established brands and protect market share must etch themselves an online presence. Companies that don't will have products fondly remembered — like the Victrola and the Grape Nehi

New media companies, which presumably "get" what the Internet is all about, are better positioned than most of the old guard (see Amazon.com vs. Barnes and Noble) but may have an equally challenging task. By nature of its interactive medium, the number of Web pages and Internet sites will increase as the number of users increases. The barriers to entry for content providers are relatively low.

The landscape of the World Wide Web will continue to evolve in 1998. Innovators in information commerce will develop the collections of content and services most useful to users — and they'll find ways to charge for them. Advertising revenue from the Internet will continue to grow, but new media players that offer services with true "value add" (be it from the Internet's 24×7 delivery, search and retrieval functionality, or just plain entertainment) will be able to charge fees for their offerings.

The "anchor sites" of the World Wide Web logically command more for advertising space than do seldom-visited sites, and 1998 will see more partnerships between these sites and established old-media companies that are starting to develop their presence online. However, the battle for anchor-site status is far from over, and Web publishers are linking and partnering in efforts to offer the sweetest eye candy.

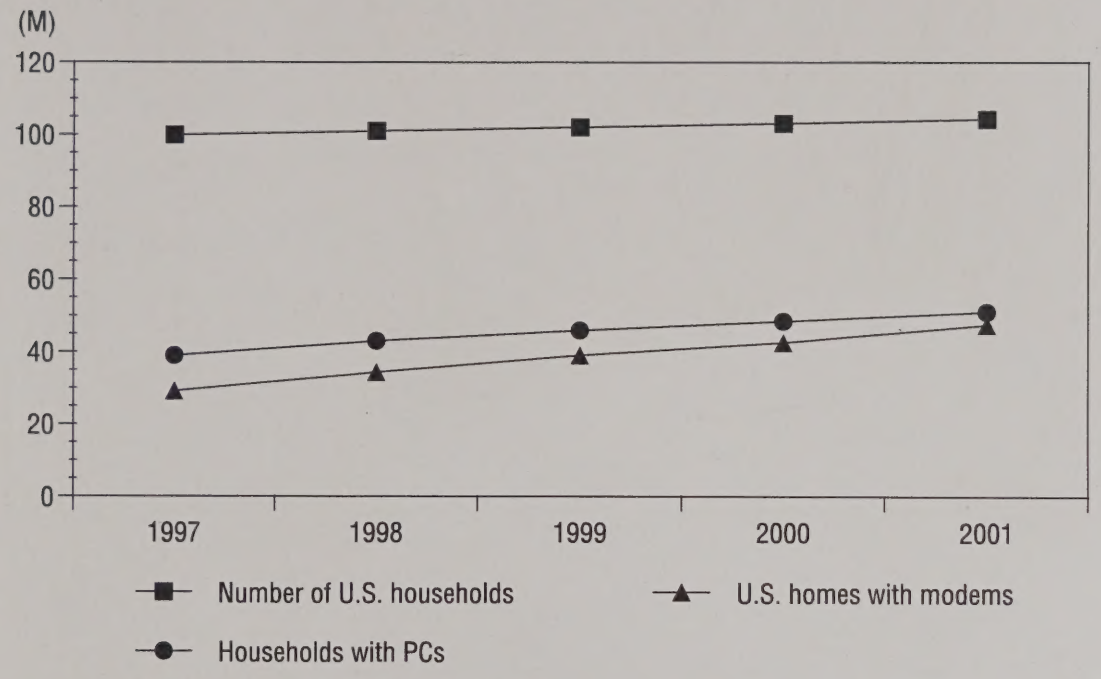
AOL's Steve Case would have future netizens believe everything they need to do online can be done within the confines of his online service's private network. MSN and Prodigy would lobby

Table 1
Who Spends the Money? Internet Commerce by Segment (%)

	1997	1998	2001
Home	40.8	35.3	25.2
Small business	12.3	14.4	20.7
Medium/large business	35.4	37.9	38.9
Government	2.9	3.3	5.0
Education	8.6	9.1	10.1
Total	100.0	100.0	100.0

Source: International Data Corporation, 1998

FIGURE 3
TOOLS FOR CONNECTIVITY



Source: IDC's *Internet Commerce Market Model*, 1998

for their respective services — and ironically, none of them may be wrong. Figure 4 shows how users spend their time when they fire up their modems.

Results from IDC/LINK's *1997 Home Media Consumer Survey* indicate e-mail is the runaway activity of choice for consumers who use online services or the Internet. Unfortunately for Web publishers and online service providers/ISPs, e-mail is a commodity item: anyone with Internet access can set up an e-mail account somewhere. Some Web sites host public e-mail accounts for no fee.

The rest of the findings regarding Internet/online usage patterns should interest companies that wish to be premier (read: often visited) sites on the Internet. Retrieving news, gaining product information, and downloading software are activities users participate in at least occasionally when they are online. Obviously, they will visit sites that offer these activities with the most added value.

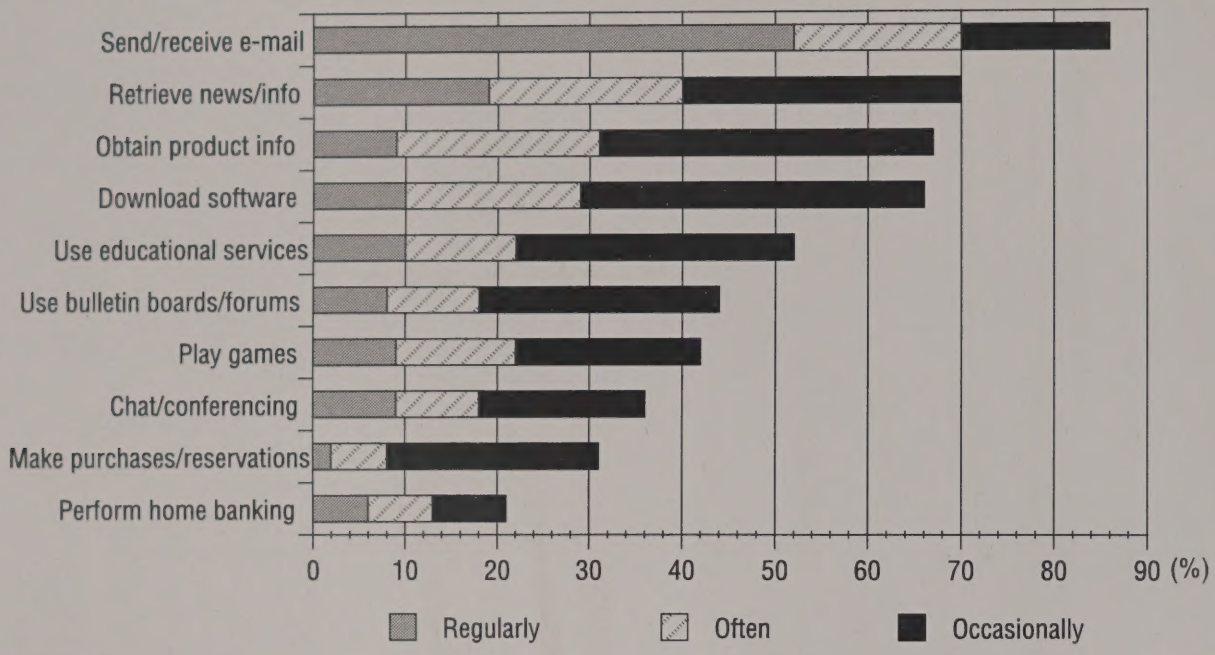
Re-enter AOL, Microsoft, and Prodigy. These online services offer all or most of the activities listed in Figure 4. However, IDC expects independent ISPs to gain market share in the Internet access service business at the expense of the proprietary online services — even though all three of the aforementioned offer Internet access in conjunction with their proprietary service.

Why are consumers increasingly choosing ISPs over online service providers as their source to get connected? No hard and fast data provide the answer. Preliminary IDC research indicates users prefer finding information through customized searches and don't need (or have the patience) to filter through pages of categories. Reports of poor service and difficulties in maintaining connections may influence new users away from online services, or conversely, as online service customers become more Internet savvy, they may be shedding the guided online service connection for the independence of an ISP (see Table 2).

This gives ISPs some clout in the Internet real estate market, because increasing numbers of users will see the home page of their ISP as their first screen when they dial in. This has caused some well-known Web publishers to partner with ISPs and begin providing a type of "virtual online service." One recent example is the deal Yahoo! struck with MCI Internet in which MCI will provide Internet connectivity to a home page featuring Yahoo!-developed services including search functions and chat rooms.

In essence, delivering the users to the Internet gives ISPs much

FIGURE 4
U.S. ONLINE SERVICES: USAGE PATTERNS BY ACTIVITY FREQUENCY, 1997



N = 407

Source: IDC/LINK's *1997 U.S. Home Media Consumer Survey*

TABLE 2
U.S. CONSUMER ONLINE SERVICE/ISP SUBSCRIPTION SHARE BY PROVIDER, 1996–1998 (%)

	1996	1997	1998
Online Services			
AOL/CompuServe	58.4	54.8	53
MSN	10.5	9.2	9.6
Prodigy	5.6	6	3.8
Major ISPs			
AT&T WorldNet	3.3	6.5	8.8
Internet MCI	1.2	1.7	3.6
Other	21	21.8	21.2
Total	100.0	100.0	100.0

Source: IDC/LINK, 1997

more than the mere power to collect subscription fees, it gives them a means to aid in the creation of new content superstars. And as Internet connectivity becomes a commodity, the power to direct traffic becomes paramount.

USERS AND THE NEED FOR SPEED

As Internet adoption increases in U.S. homes, consumers are ceasing to ask themselves questions like "what use can the Internet be to me?" and "will Internet service cost too much?" Successful content providers have proven the World Wide Web's usefulness, and cutthroat competition has forced down access costs for end users.

One of the biggest complaints users have about the Internet is the wait during the transition between sites. In a question in IDC/LINK's *1997 U.S. Home Media Consumer Survey*, which queried users who discontinued subscriptions to ISPs/online service providers, 10% of respondents canceled because of the Internet's slow response time. For service providers that are finally reaping the benefits of the nation's craze to get connected to the Internet, losing hard-earned customers simply because data transmission speeds are too slow is unacceptable.

Service providers that boast faster access speeds have a key advantage in the commodity business of selling Internet access. When 56Kbps technology first appeared, the World Wide Web was littered with banner ads from ISPs claiming to be the first to support the technology. Some ISPs hoped that promoting 56Kbps would stanch the migration of power users to super-fast cable modem access. However, the real threat to cable will come from xDSL technology, not 56Kbps.

Of the four primary xDSL technologies (ADSL, SDSL, IDSL, and HDSL), ADSL targets the consumer market. In technical trials by network service providers (NSPs) and ISPs, ADSL provided between 1.5Mbps and 6Mbps downstream data speeds. Upstream speeds are significantly slower (although still pretty fast at 64Kbps to 640Kbps), but the nature of residential use does not demand fast upstream transmission.

After two years of hemming and hawing, service providers (especially local phone competitors) are making ADSL happen. The following lists U.S. providers that are in technical trials with ADSL or are in the initial stages of deployment:

- Ameritech
- Bell Atlantic
- Pacific Bell
- SBC Communications
- US West
- MCI
- Sprint
- GTE
- ALLTel
- TCG

How will ADSL deployment compare with that of cable modems or ISDN? Although it will come on the scene this year, ADSL will take some time to gather speed (see Figure 5).By the end of the forecast period, however, ADSL will surpass ISDN and virtually match cable as a source for high-speed residential Internet access. Beyond 2001, ADSL will surpass cable in subscription numbers.

More dramatic than the growth in the number of residential ADSL lines is the growth in revenue, which will increase 1,223% during the forecast period (see Figure 6).

A number of factors could be responsible for the delay in ADSL service. Popular press articles have accused the baby Bells of stonewalling the technology, which they would have to make available to their competitors. More likely is the fact that ADSL still has some technical limitations because it uses old-fashioned copper wire as its vessel. All the service providers polled in the report DSL Technologies: 1997 Market Assessment and Forecast are optimistic that technical limitations will be overcome, and the battle with cable is on.

ISPs: The New Real Deal?

Based on the findings and theories presented above, ISPs appear to be in a commanding position within the IT industry. Subscription revenue will continue to increase, and enterprising service providers will begin fee-for-use models and may even get a piece of the Internet commerce revenue action.

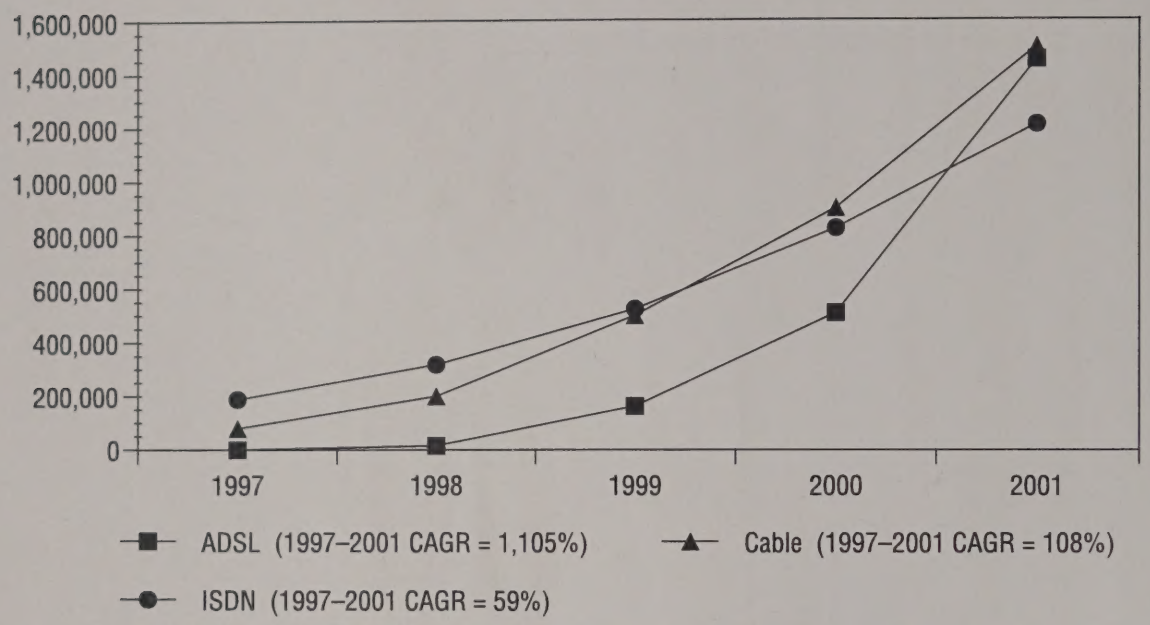
But ISPs will increase their IT industry leverage not only from the money they make, but also from the money they spend.

In 1996, public data network carriers accounted for only 36% of all WAN equipment purchases. With the rise of the Internet, public network providers are spending a lot more on equipment: by 2000, IDC predicts that they will account for 51% of all WAN equipment spending.

ISPs also are increasingly important consumers of other IT technology including servers, database management systems, Web server software, management tools, and so on. In 1998, as the power of ISPs over the IT market increases, we predict a resurgence of some market underdogs that uniquely support the Internet-scale needs of ISPs, particularly Unix (versus Windows NT) and Netscape (versus Microsoft). Conversely, we predict that Microsoft will crank up its efforts to recruit major ISPs to Windows NT and Microsoft's Web server software.

Major network equipment, server, or software suppliers had better know how to sell to ISPs and support their unique Internet-scale demands. ISPs will represent a central battleground for server and software market share just as they inhabit a make-or-break space for network equipment suppliers like Cisco, 3Com, Bay Networks, and Ascend.

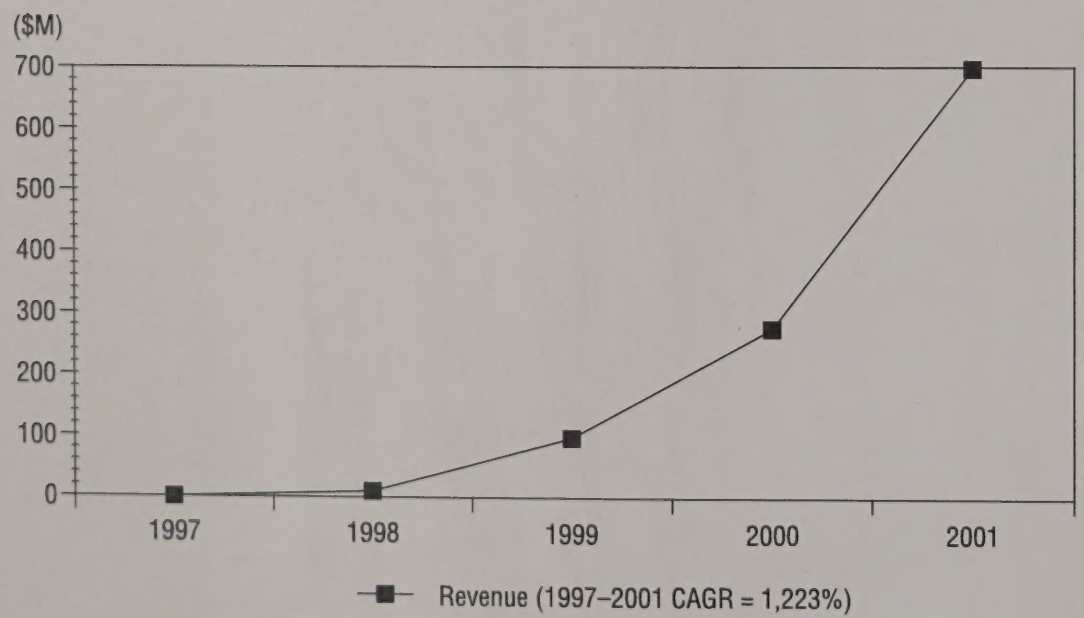
FIGURE 5
HIGH-SPEED RESIDENTIAL INTERNET ACCESS TECHNOLOGY SUBSCRIPTIONS (REVENUE-GENERATING LINES ONLY)



Note: ADSL will exist in greater numbers during the forecast period, but some lines will be nonrevenue-generating trials.

Source: International Data Corporation, 1998

FIGURE 6
ADSL RESIDENTIAL REVENUE, 1997-2001



Source: International Data Corporation, 1998

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Internet Commerce: Where Is the Money? Who Are the Players?

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January 1, 1998

IDC #15209

Vol. 32, No. 20

The holidays are over. Tax season looms. And cyber accountants everywhere are adding up Internet commerce revenues and passing judgment on the worth of the Web as a business channel.

Will Internet commerce finally live up to the hype it generated two years ago when everyone thought it was the cool thing to do but nobody was doing it? IDC data indicates that it will, and vendors supplying the products to enable this commerce have an equal chance to flourish — but as Orwell wrote, "Some animals are more equal than others."

In recent months, much of the focus in the IT industry has turned to the consumer. Hardware makers need to tap the consumer market to continue strong growth rates because commercial markets are approaching saturation. Aggressive pricing by PC makers and the development of alternate computing platforms (such as WebTV and smart handheld devices) have given price-sensitive home users the means to "get wired." Their motivation to do so usually comes from a common source: the Internet.

According to preliminary findings from IDC's *Internet Commerce Market Model,** the number of home Internet users will increase from about 48 million worldwide in 1997 to nearly 160 million worldwide in 2001. This is 35% year-on-year growth. The amount of Internet commerce taking place in the home will increase also, from $5 billion in 1997 to $59 billion in 2001.

** Note: Final results will be available in February.*

This massive incremental opportunity must mark the consumer Internet shopper as the greatest opportunity in the IT industry, right?

No.

The market for consumer Internet commerce is growing by leaps and bounds, but it is overshadowed by the size of the business-to-business Internet commerce opportunity.

According to the *Internet Commerce Market Model,* business-to-business commerce over the Internet will grow from $7 billion in 1997 to $177 billion in 2001.

THE GRAY SHEET

Associate Editor
Rick Miller

Production
IDC Publishing Services & Technologies

Editorial Advisers
Doug McLeod
Lloyd Cohen — John Gantz
David Vellante — Gigi Wang
Bruce Stephen — Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573,
Oxon Hill, MD 20750-0573

■

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Why is business-to-business commerce so hot? Although the advantages of shopping by 'Net will certainly coax some couch-rooted home users to make buys from their Lazy Boys, the advantages Internet commerce offers businesses are more than luxuries — they're becoming necessities.

The economies companies gain by integrating various pieces of the enterprise — distributors, components suppliers, shippers, and so forth — through semi-public networks or extranets has been evident for years. Large automotive makers long have shelled out big bucks for electronic data interchange (EDI) solutions to link the various and disparate members of their extended families.

The Internet claims to offer the same business necessities EDI provides (real-time inventory tracking, component ordering, etc.) without the prohibitive cost of virtual private networks. In addition, its open standards give enterprises that choose to implement Internet solutions the option to reach anyone they want, from their largest business partner to their smallest consumer.

The key for vendors of Internet commerce solutions is to offer these necessities through solutions that integrate Internet commerce as part of the enterprise for large sellers/retailers. This integration must be as timely and seamless as possible and should offer scalability and functionality that correlate with clients' needs.

As business-centric as Internet commerce is becoming, however, the focus keeps coming back to the consumer. Consumers of the 21st century will not have the tolerance that was ingrained in their analog-world ancestors. They are thirsting for instant gratification as never before, and business partners must improve their efficiencies —from sales order to fulfillment — to quench that thirst.

This issue of *The Gray Sheet* examines business theories associated with Internet commerce and product offerings from several prominent players. Also, it examines a case in which one company's attempt at Internet commerce needs to be refined.

Although the Internet may not open vast new markets, it does extend a significant degree of power to companies that recognize how to leverage the efficiencies of this new channel. In short, it will change markets, not create them.

THEORIES BEHIND INTERNET COMMERCE

The IT community has put to rest the theory that the Internet opens whole new markets for goods and services, and most decision makers recognize the Internet for what it is: a multifaceted channel that offers new efficiencies for sales, marketing, customer service, shipment tracking, inventory monitoring, and many other aspects of the total business model.

Although the Internet may not open vast new markets, it does extend a significant degree of power to companies that recognize how to leverage the effi-

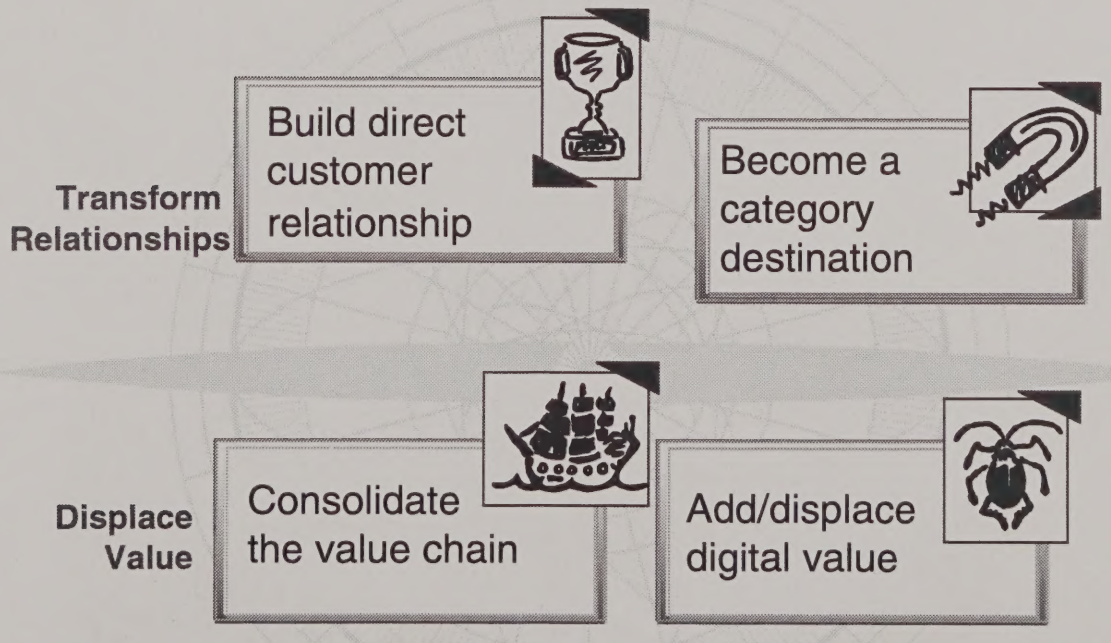
ciencies of this new channel. In short, it will *change* markets, not create them. Not surprisingly, the IT vendors responsible for enabling Internet commerce have detailed hypotheses about the ways Internet commerce will change the world.

At Fall Internet World, 1997, Open Market's chairman and cofounder, Shikhar Ghosh, presented four discrete strategies with which entrepreneuring organizations could leverage Internet commerce to outperform competitors and change the landscapes of their markets (see Figure 1). Not surprisingly, these four strategies can be implemented with Open Market products, but the theory behind these strategies is sound nonetheless.

The four strategies Ghosh and Open Market claim will provide companies with the greatest leverage are as follows:

- **Build a direct relationship with the customer through digital means.** Dell is a fine example of the direct relationship. It offers its customers easy access to its products through a well-organized Web site, so purchasing is a no-brainer. Dell collects information about its visitors and enhances the shopping experience by personalizing what it displays to its repeat customers. Dell leverages the knowledge it gains from its visitors to formulate selling strategy.
- **Consolidate the value chain.** CNet began selling PCs and other computer goods through an online site to much acclaim. Why? It adds value through its content on its Web site because it regularly provides performance and functionality information about IT products. Consumers can use this information to aid them during the buying process. Thus, CNet has added value by way of consultation — consultation that would have come from integrators or value-added resellers.

FIGURE 1
DEFINING THE STRATEGY



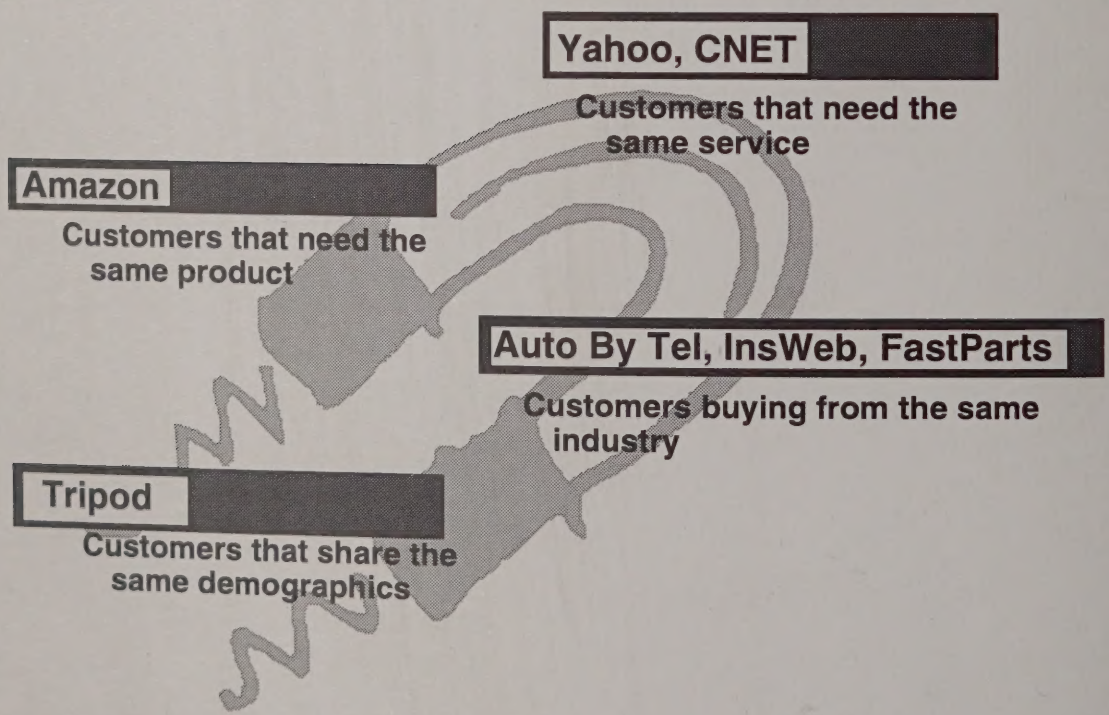
Source: Open Market and International Data Corporation, 1998

- **Add value or displace value by using a digital medium.** Companies whose products are information — namely, old-guard media companies — can defend their markets and supplant slow-moving foes by leveraging the power of digital to enhance content. Although shifting general collections of information, like newspapers, to digital format does little to add value (except eliminate the physical space limitations imposed by the printed page), archives of specific information prove to be very useful. Digital classified advertising is a valuable offering because of advanced search and display features afforded by the digital format. Online catalogs echo this functionality.
- **Become a needed destination.** Some commerce sites win because customers flock to popular destinations (see Figure 2). Through pure domination of mindshare, **www.amazon.com** is the place people go online when they shop for books. Amazon dominates this market segment not only because it offers a seemingly limitless selection, but also because it utilizes the digital medium to the fullest. Readers and fans can post their own book reviews on the Amazon site, and popular authors frequently submit their own critiques.

  Search sites make up another example of destination sites because eventually, everyone needs to search the World Wide Web for something. Anchor sites like Yahoo make obvious candidates for successful Internet commerce hosts. Furthermore, other destination sites are cropping up based on like needs and demographics. One such site, **www.tripod.com,** caters to young adults in the 20-something category.

The key for companies developing an Internet commerce strategy is to decide what strat-

FIGURE 2
CUSTOMER MAGNETS?


Yahoo, CNET
Customers that need the same service
Amazon
Customers that need the same product
Auto By Tel, InsWeb, FastParts
Customers buying from the same industry
Tripod
Customers that share the same demographics

Source: Open Market and International Data Corporation, 1998

egy best serves their business model and best complements their market position. The key for Internet commerce solutions vendors is to supply products (or services) that bring their clients' strategies to fruition quickly and without error.

OPEN MARKET

Open Market, in Cambridge, Massachusetts, bills itself as a total Internet commerce application solutions provider. Its key products are Transact, LiveCommerce, and Folio, which provide commerce, catalog, and digital delivery solutions, respectively.

Open Market's Transact uses a technique called SecureLink, which allows companies to keep the order-processing portion of the Internet commerce application separate from their content.

TRANSACT

Transact is Open Market's Internet commerce application. The offering is secure, scalable, and robust, with a feature set that includes customer authentication and authorization, order and payment processing, automated tax and shipping calculations, order tracking, and online customer service. Transact uses an Open Market technique called SecureLink, which allows companies to keep the order-processing portion of the Internet commerce application separate from their content. The way this works is as follows:

- Users point their browsers to the URL of a commerce page, which displays the content describing the goods to be sold.
- Users who decide to buy click on a "buy" icon that contacts the transaction portion of the application on a separate server somewhere else in the enterprise.
- Buyers are now interacting with the transaction server only, not the content server, but information about the product they wish to buy is transferred from the content server to the transaction server.
- The order is accurate, but consumers never interact directly with the content server (see Figure 3).

This feature provides more than just added security. It provides empowerment across a company's enterprise. All Internet commerce can be conducted in a single location, but content (i.e., goods sold) servers can reside anywhere. Thus, product managers in divisions that reside in disparate locations can make amendments to their product offerings and maintain their servers separately, but online shoppers will see a seamless product offering. This capability comes in handy if an enterprise decides to make some of its product lines available for online commerce at one point and then commerce-enable other product lines later on.

The Transact Internet commerce solution also offers digital coupons, so businesses can offer online incentives at their Web site, in banner ads at other Web sites, or through e-mail delivery. Important to the business-to-business segment, Transact accommodates various payment options, including private accounts and invoicing, and goes beyond credit-card-only payment.

LIVECOMMERCE

Complementing Transact is LiveCommerce, Open Market's industrial catalog offering. Companies can purchase this product in conjunction with Transact, or they can purchase it standalone. LiveCommerce is built to be compatible with Transact's SecureLink system, but it can work well with other commerce solutions.

LiveCommerce allows businesses to customize the look and feel of their catalogs and offers extensive search capabilities, including parametric searches. The catalog can be optimized for specific customers or groups, and it supports sales and promotional events. LiveCommerce's rules engine prevents buyers from selecting incompatible parts.

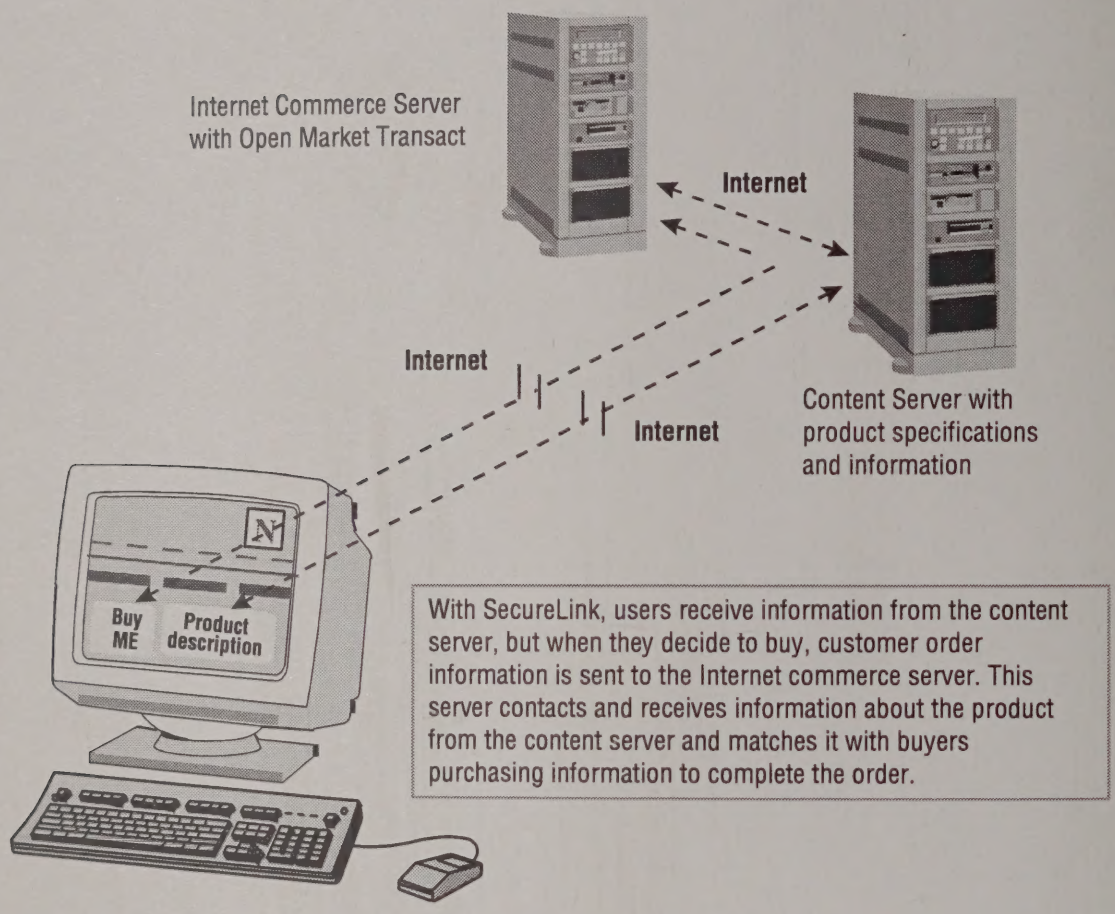
Systems requirements for LiveCommerce are not outrageous (Pentium 200MHz, 64MB RAM, and Windows NT 4.0).

FOLIO

Folio is Open Market's foray into the world of paid digital publishing. Folio (which was a separate company until Open Market purchased it last year) provides solutions for professional publishers and information commerce companies that seek to deliver via the Internet.

Folio's primary function is to compile different types of information in different formats from different sources and de-

FIGURE 3
OPEN MARKET'S SECURELINK SYSTEM


Internet Commerce Server
with Open Market Transact
Internet
Internet
Internet
Content Server with
product specifications
and information
Buy
ME
Product
description
With SecureLink, users receive information from the content server, but when they decide to buy, customer order information is sent to the Internet commerce server. This server contacts and receives information about the product from the content server and matches it with buyers purchasing information to complete the order.

Source: International Data Corporation, 1998

liver it to customers in the manner in which they wish to receive it. Folio automatically converts documents to HTML.

Folio's metering functions determine who accesses information and when, making it a logical complement to Transact, which lets companies charge fees for access. Multiple security options prevent unauthorized access and control the way end users can use the information and the length of time for which they can have access.

Folio's client list is a virtual who's who of information commerce companies, including USA Today, Wachovia, and Citibank.

OPEN MARKET OUTLOOK

Open Market's offerings in Internet commerce applications provider are highly innovative. The company's Transact product is arguably the best in the industry, and LiveCommerce and Folio complement it well. The company has enjoyed improving revenues since it went public, although it has yet to make a profit. IDC forecasts this company to earn about $60 million in CY/FY 1997.

Open Market could be on the cusp of software industry greatness. However, it should modify its business model in some ways if it is to reap exponential growth.

Because of the nature of the Internet commerce market, Open Market could be on the cusp of software industry great-

ness. However, it should modify its business model in some ways if it is to reap exponential growth. The Transact product, Open Market's flagship, is priced just out of reach for many midsize businesses — a space in which IDC sees great opportunity for Internet commerce solutions.

Open Market has reached midsize businesses by selling Transact to network service providers like AT&T, which in turn offer Internet commerce functionality to their smaller clients. Transact, because of its distributed architecture, is fantastic for this purpose, but Open Market needs to reap more incremental revenues from the end users in this channel. The big winners here appear to be the AT&T types that resell the service.

One shortcoming for Transact is its Unix reliance. Open Market does not have a Windows NT version of this application yet. Company sources say it is in the works, but no release date is available. IDC sees the proliferation of NT as a forewarning that Open Market may miss a huge opportunity in the midsize space if it does not cater to the environment these businesses prefer.

Open Market must also tackle the "dancing with elephants" dilemma. Companies in its target market, high-end enterprises, usually have established relationships with the enterprise resource planning (ERP) vendors. The SAPs, PeopleSofts, and Baans of the world can prevent Open Market from penetrating lucrative accounts by offering their own Internet commerce solutions (real or imagined). ERPs could benefit by using Open Market's top-notch solution rather than building their own, and Open Market should actively seek joint ventures here; the question is, with whom? SAP is tied to its own commerce solution provider, Pandesic (see below).

If Open Market can succeed in earning greater revenues from the midsize business segment through an NT solution or from its commerce supplier channel (AT&T) and/or solidify its position in the high end with an ERP partnership, the company could put a choke hold on the industry. Its products are sound, and the market can only grow from here.

PANDESIC

Pandesic is a joint venture of SAP and Intel designed to offer out-of-the-box Internet commerce solutions to smaller businesses. Its present offerings are suited only for business-to-consumer applications, but IDC sees Pandesic threatening Open Market and other Internet commerce players in the business-to-business space for one important reason: it's backed by SAP.

The Pandesic solution available now is good at what it does. The hardware is all Intel-based, and the software provides order processing, shipping arrangements, inventory processing, and reconciliation with accounts payable, accounts receivable, and the general ledger. It's restricted to the business-to-consumer segment because credit card is the only payment option it supports.

Unlike Open Market's Transact, Pandesic's solution sits in a box isolated from the rest of the enterprise. With this offering, Pandesic is assuming clients will be conducting Internet commerce independent from other business functions. This arrangement distinguishes it from Transact and leaves it at a disadvantage — for now.

In December, parent company SAP announced it bought a stake in another Internet commerce concern, Commerce One. Commerce One's system customizes catalogs, listing only negotiated prices and items approved for purchase by the buyer's procurement department — an essential function in the business-to-business space. The agreement also announced that Commerce One would gain the ability to integrate seamlessly into SAP's omnipresent R/3 ERP software.

This announcement puts Pandesic in an interesting position. It will gain business-to-business functionality from its new relationship with Commerce One; it presumably will be able to integrate with SAP's ERP software to the same extent Commerce One will, and in theory it may find itself competing in the same market as its new half-sibling.

What is yet to be determined is how much a business-to-business offering from Pandesic will cost and just how much functionality it will have. Those factors may determine the amount of overlap between it and the pricey-yet-functional Commerce One.

A second big question mark hovers over the Pandesic busi-

ness model. With its business-to-consumer offering, Pandesic presents more of a service than a product. The client gets the hardware and application for a price much lower than that for Open Market's transact, but Pandesic collects a percentage fee from each transaction in return for maintaining the server. Small businesses may pay this tariff for an easy entrance into a new retail channel, but larger companies are less likely to stand for it. Business-to-business enterprises certainly won't.

What does the Pandesic story mean for the Internet commerce industry so far?

Pandesic collects a percentage fee from each transaction in return for maintaining the server. Small businesses may pay this tariff for an easy entrance into a new retail channel, but larger companies are less likely to stand for it. Business-to-business enterprises certainly won't.

Pandesic's business-to-consumer retail offering is great for smaller merchants, especially if they don't need to automatically integrate their Internet business with their physical business, so business-to-consumer vendors are up against a tough foe in this segment. In business-to-business Internet commerce, the view remains cloudy. Are Pandesic and Commerce One headed for an eventual merger under the SAP umbrella?

NETSCAPE COMMERCIAL APPLICATIONS

Netscape's electronic commerce applications division (formerly Actra) is a joint venture of GE Information Systems and Netscape Communications: one company that represents the old guard in EDI commerce solutions and one that represents the new guard in Internet-based commerce solutions. Not surprisingly, their Internet commerce offerings are targeted at companies that still rely on EDI networks as well as companies starting electronic commerce from the ground up with Internet-based commerce.

Netscape's focus on the largest of companies entails an offering to extend their supply chains to include smaller business partners that heretofore did not have the ability to support a private EDI network. Netscape's flagship Internet commerce product, ECXpert, enables front-end clients to talk with back-end legacy systems, thus preserving substantial investments.

ECXpert handles multiple data types, including EDI, binary files, objects, and HTML, and it interacts with EDI and Internet networks while tying to back-end systems like finance and logistics. The application runs on Sun Unix systems as well as Windows NT 4.0. The ECXpert package provides the total EDI-to-Internet commerce solution, integrating with existing hardware and systems and providing necessary additional hardware to complete the application.

MerchantXpert is Netscape's offering for online retailing. Its feature set is similar to that offered by Pandesic, and it offers scalability for aggregating multiple commerce sites. MerchantXpert offers a staging system (Netscape's answer to SecureLink) to securely load and preview content. MerchantXpert costs between $50,000 and $75,000, with an incremental uplift for additional servers. Staging systems sell for about 60% of the overall system price.

PublishingXpert competes with Open Market's Folio product and is targeted toward purveyors of digital content. It sells under the same model as MerchantXpert, above.

REACHING THE CONSUMER: HOW TO DO IT WRONG

A GRAY SHEET COMMENTARY

How close have vendors and retailers come to creating a seamless buying experience for the average citizen on the Internet? They are improving, but many companies must refine their business process if they wish to win the minds of fickle consumers and reap the benefits of advanced front-office/back-office automation.

The inefficiencies that sully the good name of Internet commerce continue to stand out from the offerings of the supposedly paramount providers of forward thinking: the IT community.

Take the following case in point:

This holiday season, I elected to make my first major purchase over the Internet — a low-priced PC for my parents. After some brief cyber research, I found a model that would meet the needs of my low-tech mom and pop and keep within my budget. I zeroed in on a $999 model (complete with monitor) from Computer City.

To Computer City's credit, I most likely never would have found such a deal if it weren't prominently displayed on its home page. I could not find any other PC retailer that was offering a 200MHz processor with a 16x CD-ROM and a color monitor for the magical sub-$1,000 price point. Unfortunately, finding the product was about where my pleasant online shopping experience ended.

The inefficiencies that sully the good name of Internet commerce continue to stand out from the offerings of the supposedly paramount providers of forward thinking: the IT community.

Computer City does not offer online purchasing yet, so I had to write down the pertinent product information and model numbers and then phone its toll-free sales line. This was only a minor inconvenience, but it served as an omen for things to come. Computer City's phone support employees were courteous and friendly, but they were confused about how to fulfill the offerings. The home page had few suggestions about delivery and set-up services.

I asked if I could receive delivery via Federal Express (for an additional fee) and have the package sent directly to my parents' home in upstate New York. The Computer City associate did not know who would handle the two-day shipping but said it was available. She quickly added that Computer City would not guarantee delivery by Christmas. This sounded reasonable to me because it was December 22 when I called to place my order. I decided to take my chances. (The sales associate and I both speculated that the package would arrive on December 24 if I spent the extra cash for two-day express delivery.)

I completed the sales process, which involved reading my credit card number, home address in Boston, and parents' address in New York to the associate. In return, she gave me a shipment tracking number and wished me happy holidays. (She was uncertain whether the tracking number was an internal number or the tracking number issued by Federal Express.)

By noon on December 24 the PC had not arrived. I wasn't surprised, given the busy season, but I decided to call again to check the whereabouts of the present.

Again the folks at Computer City were courteous and friendly, but again they suffered from confusion. They told me the package had not been shipped by FedEx; instead, they shipped it over ground to the store nearest my parents' home. The bad news was that the store was 80 miles away in Holyoke, Massachusetts. The even worse news came when I called Holyoke ... the store did not have the PC at all.

This report prompted a third call to the Computer City toll-free sales number. After much apology, they found my computer in a store in Manchester, Connecticut, more than two hours from my parents' home. I called the Manchester store (not toll free) and spoke with a manager to weigh my options. He offered ground shipping from his store, which would take four or five days, or FedEx shipping that would take two or three days. However, these options proved to be moot. He refused to ship the product to any destination except my home address in Boston because that was the address associated with my credit card.

The final twist sealed my fate. I had no choice but drive 120 miles to Manchester to pick up the gift in person. When I got to the store, I identified myself as an industry analyst and asked the store manager to explain the mail-order sales process that began with my innocuous visit to the Computer City home page and ended with a two-hour drive to Connecticut. He explained that Computer City's toll-free sales department sends all mail-order requests (via e-mail) to the local stores, which process the orders and deliver the products per the customer request. Applicable taxes apply, and the sale is recorded as originating from the store that ends up delivering the product.

This is a flawed example of an Internet commerce model for

many reasons, not the least of which was the inconvenience I endured. Computer City's toll-free sales line is a perfectly acceptable channel to reach consumers, but online sales software would save man-hours the telesales associates spend speaking with customers. (My original call lasted 20 minutes; follow-ups lasted longer.) As one follows the purchase-to-fulfillment process further, however, the need to integrate this software with other business functions becomes apparent.

Large shipping companies like FedEx and UPS are working with clients to streamline the sales process by receiving shipping orders directly from automated requests.

If Computer City had its act together, my original order would have initiated the shipping process at the moment the sales associate (or optimally, the Web site) recorded the sale. Large shipping companies like FedEx and UPS are working with clients to streamline the sales process by receiving shipping orders directly from automated requests. In an ideal world, online merchants will record a sale, the transaction software will notify the shipper of the order (complete with all relevant product information), and the shipper will schedule the item for delivery direct from a distributor within microseconds of the consumer's decision to purchase.

(Even without an online transaction application, stores like Computer City could efficiently process the sale manually if they used a streamlined business process.)

The Computer City model exhibits further flaws as the transaction progresses. Communication between the central office, where phone-order/mail-order/Internet sales originate, and the local stores, which are responsible for fulfilling the merchandise, has many gaps. In my case, the Holyoke store that was supposed to have my merchandise (and thus was responsible for shipping it) never responded to the e-mail from the central office that announced a sale had taken place. Thus, the local store never informed the central office that it did not have my PC, and the central office had no way to know it had to locate my PC at another local store.

And the redundancies continued. The sales clerk at the Manchester Computer City at which I finally found my PC had to reenter my transaction when I arrived to buy the machine — even though I had offered all the pertinent information, including my credit card number, when I placed my order on the phone several days prior.

Karen Marino, vice president of direct sales and support at Computer City acknowledged the current inefficiencies of the Computer City Internet/mail-order sales model in a subsequent interview. Part of the communications problem, she believes, is because Computer City outsources its telephone order call center. Customers who call 1-800-THE-CITY will not speak to actual Computer City staff. The third-party call center is responsible for notifying retail stores to fulfill orders around the country.

Ms. Marino was quick to point out that Computer City is not oblivious to the shortcomings of its present model, and she announced some major restructuring efforts intended to address the situation. By the end of 3Q98, Computer City plans to bring all call center activity in house, implement an online transaction processing system for Internet sales, and build a single distribution center to service all Internet/mail-order sales in the United States. (This distribution center will receive some support from major PC distributors like Ingram.)

The Internet is a powerful tool for slicing margins and increasing interactivity with customers and prospects, but if companies don't practice the fundamentals, they will fail miserably.

These measures should make great strides toward remedying Computer City's lackluster Internet/mail-order sales model. The question is, will it be in time?

THE MORAL OF THE STORY

What is the moral of this story? Computer City spent between one and two staff hours to sell me a low-margin machine that I could have purchased in less than one minute if the company had been making full use of a coherent Internet sales model. It also managed to alienate me as a consumer because at no point

did any company representative, including the Manchester store manager, offer me any perks or incentive for my inconvenience.

The Internet is a powerful tool for slicing margins and increasing interactivity with customers and prospects, but if companies don't practice the fundamentals, they will fail miserably. In the same vein, as customers become more Internet savvy and realize the efficiencies to be gained through cyber shopping, their tolerance for wasted time and redundancy will drop like a stone. Other electronic merchants can learn from Computer City's example: The Internet has not changed the principles of good business; it has merely increased the speed.

TABLE 1
DO'S AND DON'TS FOR CONSUMER INTERNET COMMERCE

The Best Way	The Wrong Way
Companies that take Internet commerce seriously will invest in Internet commerce applications that make the sales transaction seem virtually seamless to the consumer.	Companies that try to use the Internet as a driver for an analog sales transaction model will fail if the model doesn't operate with the same efficiencies as an automated one.
Companies that sell physical goods (as opposed to digital fare like software) through the Internet will incorporate automated shipping processes into the sales transaction, through either third-party shippers or an in-house shipping department.	Even the best-organized business process will be subject to human error if sales agents initiate the shipping process by hand, and manual processing will never match the speed of automated processing.
Centralized, strategically located distribution centers linked by inventory management applications make it easy for companies to monitor the amount of product they have available.	Numerous scattered retail locations make poor outlets for distribution, especially when store personnel have responsibilities beyond filling Internet-commerce sales orders.

Note: Complete automation is a rule that still has some exceptions. Even the most efficient Internet commerce company will need "real people" to answer questions about product and respond to complaints. But if the model runs properly, complaints will be few.

Source: International Data Corporation, 1998

IMPORTANT SUBSCRIPTION INFORMATION ABOUT THE GRAY SHEET

Dear Subscribers:

After the better part of a decade, *The Gray Sheet* is forced to raise its rates for some of its offerings. Beginning on March 1st 1998 a one-year subscription for *The Gray Sheet*, delivered in paper format, will cost $695. Reprints of single issues will cost $75 each.* The cost of special issues and double issues will remain constant, at $195.

Although we regret to inform you of the rate increases, we are pleased to announce news about changes in *The Gray Sheet's* content. Some of you participated in our customer survey last year, in which we asked for feedback about the areas of the IT industry you wish to see most often in our coverage. Your demands were clear!

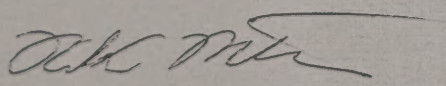
In response to your suggestions, *The Gray Sheet* is shifting its focus. We will be featuring more in-depth analysis of events and trends in the Internet industry – from software and hardware suppliers to content providers and Internet commerce leaders – and we are grounding news from this tumultuous market segment in the high-level, top-line analysis you've come to expect from *The Gray Sheet.* The Internet is the next greenfield opportunity for IT professionals and decision makers, and *The Gray Sheet* will give you the big picture of the Internet's effect on IT market players and the global economy as a whole.

Also, expect more competitive analysis in our newsletter. Will AOL lose share to MSN this year? How about to the hungry pack of ISPs clamoring for their share of the Internet connectivity market? What is the fate of old-guard telecommunications carriers in the face of Internet telephony? The answers are in subsequent issues of *The Gray Sheet.*

You can receive delivery in new ways too. *The Gray Sheet* is available through the Internet via IDC's IDCNet Web-delivery model. IDCNet gives you full search capability, instantaneous delivery, and *Gray Sheet* archives for free with your one-year subscription. *The Gray Sheet* also is available for site license (in print or Web-based delivery) to give multiple readers across your enterprise access to market data that will affect their decision making – and the cost per copy diminishes rapidly according to scale.

I hope you continue to gain from reading *The Gray Sheet* and take advantage of our new features and offerings. As always, you can direct your questions to me at (508) 935-4530 or rmiller@idcresearch.com.

Sincerely,



Rick Miller
Editor, *The Gray Sheet*

** Note: Subscribers who renew before March 1st are still eligible for the previous annual rate of $495. All new subscriptions or renewals after March 1st will cost $695.*

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Keeping Up with the Joneses: Internet Results from the 1997 *ISI*

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December 1, 1997

IDC #15024

Vol. 32, No. 18–19

Every society has its Jones family, and the information society is no exception. So who's sporting the biggest gas grill and the trimmest lawn in the new global economy? IDC performed a virtual neighborhood watch to see which countries are the pillars of the community and which look more like *The Simpsons*.

IDC teamed with international publisher World Times again this year to produce the *Information Society Index*, which measures the relative ability of members of the global community to absorb and profit from the global information revolution. In the *ISI*, nations receive scores on myriad social, computing, and communications variables that collectively indicate their level of technological savvy and willingness to permit citizens to embrace technology to the fullest extent.

Anyone who read the previous issue of this newsletter, *Pick the Planet's Pockets* (IDC #14808), knows that a selection of countries and industry subsegments are exhibiting a craving for Internet goods and services. This double-issue of *The Gray Sheet,* using data extracted from the *ISI*, expounds on the Internet findings presented in the last issue from a macroscopic perspective. Internet findings from the *ISI*, in the context of the *ISI* as a whole, show not only Internet appetites but extraneous factors that help or hinder a nation's ability to digest IT offerings.

Key findings from the 1997 *ISI* include the following:

- The United States led the index for the second straight year, scoring 4,833 points to second-place Finland's 3,591.
- Malaysia moved up three positions in rank as a cadre of Asian nations closed ground on the traditional Western leaders.
- An encouraging statistic for world Internet development is the 16% improvement in the quality of the world's phone lines.
- The worldwide Internet host score improved 55% from 1996.
- The worldwide Internet service provider score improved 134% from 1996.
- The United States scored the best in two variables with direct implications for Internet adoption (Internet service providers and telephone line errors), but Finland and Hong Kong scored highest in the remaining two (Internet hosts per capita and telephone lines per household, respectively).

THE GRAY SHEET
Associate Editor
Rick Miller

Production
IDC Publishing Services & Technologies

Editorial Advisers
Doug McLeod
Lloyd Cohen — John Gantz
David Vellante — Gigi Wang
Bruce Stephen — Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573, Oxon Hill, MD 20750-0573

■

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Taken as a whole, the 1997 *ISI* findings bolster several theories, ranging from trite to erudite.

Generally speaking, the world is crazy about the Internet. Although this may seem a hackneyed concept, data in the *ISI* adds legitimacy to a theory that was based on as much hype as it was based on fact until this year.

The *ISI* adds credence to the theory that third-world nations have the possibility to "leap frog" ahead of established powers to assume paramount roles in the new economy. Internet commerce wonks and fans of the Far East economies may not stand aghast at this hypothesis, but they can ground their beliefs in survey findings that show nation after nation in Asia/Pacific climbing the technology adoption curve.

The *ISI* also illustrates the interplay between the Internet's computer-related components and communications-related components. Drastic gains in computer infrastructure are mirrored by gains in telephones per household and faults per phone line, variables that would remain relatively static if the Internet were not driving a need for their improvement.

WHAT THE INFORMATION SOCIETY INDEX MEANS

In 1996, IDC and World Times launched a study to establish a standard by which to measure all societies around the world and their progress into the information age. Just as GDP is the standard by which to measure the economic wealth of a nation, so the *ISI* measures the information wealth of each nation.

This 1997/1998 report shows where each country ranks with regard to its capacities to access and absorb information and information technologies. It also shows how each country and region have progressed during the past year. Using the 20 variables developed during 1996, the 1997/1998 study indexes 55 countries. These countries account for 96% of global GDP and more than 99% of all information technology expenditures.

The 20 variables that comprise the *ISI* are grouped into three core infrastructures. The Computer Infrastructure measures each country's capacity to receive, manipulate, and transmit digitized data via personal computers and the Internet. The Information Infrastructure comprises measures of each country's capacity to receive and transmit digitized bytes of information in voice, text, and video formats. The Social Infrastructure measures the extent to which each society has citizens capable of taking advantage of such information and information technologies and a political system that permits them to do so.

The variables encompass more than traditional technology-based data because IDC and World Times analysts propose that participation in the information society is not solely dependent on IT advancement. Although a healthy IT environment is necessary to facilitate participation, poor social systems or weaker appetites for information (as measured by certain variables in the social infrastructure) can be as great a hindrance as a lack of Internet resources.

Table 1 lists the 20 *ISI* variables, grouped by infrastructure.

THE COMPUTER INFRASTRUCTURE

The Computer Infrastructure grouping looks at the computer (specifically the PC) and the Internet, which has already become the

Information Superhighway that seemed mostly hype only two or three years ago. In this *Gray Sheet,* IDC presents findings from the two computer variables most closely linked to the Internet industry:

- **Internet providers.** IDC and World Times believe that the number of companies offering access to the Internet for businesses and individuals, at least in prospect, is an indication of relative success for the Internet in respective nations.
- **Internet hosts.** The number of Internet hosts per capita is one of the best indices of the successful penetration of Internet consciousness across the globe, even if the average number of users served by individual hosts may vary sharply by country.

THE INFORMATION INFRASTRUCTURE

The variables in the Information Infrastructure represent non-computer technologies that will be used by, or may be replaced by, the digitized technologies of the Global Information Revolution. They include both business and individual entertainment media because both types of information will be incorporated in future digital formats. The Information Infrastructure also includes two variables that measure the quality of nations' communications networks. This *Gray Sheet* examines these variables because they directly correspond to the quality of Internet connectivity:

- **Telephone lines per household.** Lines per household are literally and figuratively what "wired" means. Telephone connections are the predominant means of communication between computers on the Internet and almost certainly will be one of the major external links for other information appliances.
- **Telephone faults.** Simply building lines is inadequate preparation for the global information revolution if faults per line per year are too high. Particularly if very large packets of important data are to be transmitted, the maintenance of the physical infrastructure is essential. In the *ISI*, the figure for telephone faults represents the inverse of the data, so that, as with the other variables, a higher number is better than a lower number.

THE SOCIAL INFRASTRUCTURE

The Social Infrastructure is the irreducible minimum of preconditions for individuals' effective utilization of the technologies cited in the other two groupings. The first three variables center around education and practical literacy. The other two factors deal with the freedom to access and make use of technology.

BUILDING THE INDEX: METHODOLOGY ISSUES

Most *ISI* variables, unless they were percentages and therefore comparable from the outset, were proportioned against a nation's total population or a pertinent

TABLE 1
THE INFORMATION SOCIETY INDEX VARIABLES BY INFRASTRUCTURE

Computer Infrastructure	Information Infrastructure	Social Infrastructure
Personal computers installed per capita	Telephone lines per household	Newspaper readership per capita
Personal computers shipped to the home per household	Inverse of telephone faults per line per year	Percent of relevant age cohort in tertiary education
Personal computers shipped to government or commercial sites per the nonagricultural workforce	Television sets per capita	Percent of relevant age cohort in secondary education
Personal computers shipped to education per total teachers and students	Radios per capita	Support for civil liberties
Percent of personal computers on local area networks	Fax machines per capita	Recognition of press freedom
Proportion of software spending to hardware spending	Cellular phones per capita	
Number of Internet service providers	Access to cable and/or satellite television	
Internet hosts per capita		

Source: International Data Corporation and World Times, 1997

subset (e.g., households for home PC shipments, or the total number of teachers and students for PC shipments to educational institutions).

IDC and World Times investigated several economic factors (as well as the computer, information, and social factors) and considered them as variables in the *ISI*. However, economic factors did not correlate strongly with IT spending. Neither the proportion of GDP represented by the service sector, nor annual growth in GDP, nor market capitalization, nor growth in market capitalization proved relevant. As a result, there is no economic component to the *ISI*.

This absence is less surprising than one might think. For one thing, economic categories broad enough to allow country comparisons typically encompass a profusion of very disparate activities; the service sector in particular includes so many different types of enterprises with vastly different relations to information technology that correlations weaken to the point of irrelevance. For example, a service sector with a high concentration of system integrators, Web site developers, and the like will show an inordinate correlation between IT spending and GDP when compared with a service sector comprised mainly of barbers, funeral directors, and other non-technology-oriented professions that in all likelihood will never rely on IT to streamline their tasks.

Relationships between IT spending and GDP tend to change according to the degree of development of the overall economy and of IT penetration. In developing economies, IT spending growth typically significantly outpaces overall economic growth. In most developed countries, IT spending will track GDP growth and may even fall behind during recessions. In a handful of leading-edge IT countries, however, IT spending may begin to grow faster than overall growth again.

Reasonably strong correlations were found for 16 of the variables. As one would expect from regression analyses against IT spending as a proportion of GDP, computer-related variables, especially PC shipments, proved especially relevant. Also strongly correlated were several social variables, including secondary and tertiary school enrollment and a number of items in the related information infrastructure.

Limiting index variables to factors with strong relations to current information technology spending, it was recognized, might inadvertently exclude technologies and infrastructure issues that might not display a statistically meaningful correlation today but could become critical components or potential limitations to the Global Information Revolution tomorrow. IDC and World Times analysts therefore pooled ideas and added several other variables to address future trends rather than existing spending patterns. These included the two Internet variables and the variable for faults per telephone lines per year that are profiled in this *Gray Sheet*. A variable regarding the availability of either cable or satellite television also was added because of its future implications to the information society.

The resulting numbers were standardized an order of magnitude because the data as developed would be biased toward the most common technologies (e.g., radios would vastly outweigh faxes in importance); the solution was to bring all 20 factors to roughly comparable positions at their mean, at around 100 points. The effect of this exercise was to bring the average for all variables into roughly the same level of importance.

Note: Raw scores have changed (decreased) from the original data generated in 1996 because of IDC's attempts to normalize certain variables closer to the projected 100-point mean. Year-on-year comparisons reflect changes in the new normalized numbers for 1996 and 1997.

Overall ISI Results

To add a colorful metaphor to the grand mass of data that is the *ISI*, IDC and World Times grouped the 55 participating nations into four subcategories representative of their momentum toward functional information societies: Skaters, Striders, Sprinters, and Strollers.

Skaters are the *ISI* elite, with overall scores greater than 3,500. Only the United States and Finland were classified as Skaters in 1997. (Sweden reached Skater status last year, but slipped in 1997.) Skaters receive high scores in all three infrastructures and represent the most developed of national economies (see Table 2).

Striders are the second tier of nations in the *ISI*. Most of the nations in Western Europe and several advanced Asia/Pacific nations are Striders. These countries have established economies and strong infrastructures but need to invest even more on their computer and information variables to reach elite status (see Table 3).

Sprinters are nations that exhibit spurts of growth followed by periods of recovery. They have major weaknesses in all three *ISI* infrastructures but are advancing scores in their computer vari-

ables. As a group, their telecom and IT expenditures are far lower than their Strider and Skater cousins (see Table 4).

Strollers are the largest of nations and are the least economically developed. They are weak in all three infrastructures. Most Stroller countries are working to develop a competitive information infrastructure, which if successful will help them link their large populaces and create huge steps forward in their quest to participate in the information society (see Table 5).

THE BIG GAME: WINNERS AND LOSERS

The unique position of the United States in terms of the information revolution is clearly evident from its overall score — nearly 1,300 points above second-place Finland. Also significant is Finland's two-step jump over the year — the result of important strides made in its computer infrastructure.

Notable among the Striders, is the extraordinary strength of the rest of Scandinavia. In addition, Hong Kong's move up and Germany's slide down over the year is further evidence of how seriously the Asia/Pacific nations are taking the information revolution — in contrast to most continental European countries.

There were two surprises among the Sprinters. The first surprise was Italy's two-ranking slide, which increases rather than closes its gap on the Striders. Also, Malaysia's three-place jump because of substantial investments in its telecommunications and computer infrastructures brings it from the Stroller to the Sprinter category.

Brazil improved from Stroller to Sprinter in 1997 and moved up

TABLE 2
SKATER MARKET DATA

	$M	% of World Data
IT expenditures	255,000	42
Telecom expenditures	246,000	16
GDP	7,700,000	27
Population (M)	268	5

Source: International Data Corporation and World Times, 1997

TABLE 3
STRIDER MARKET DATA

	$M	% of World Data
IT expenditures	272,000	45
Telecom expenditures	76,000	50
GDP	12,200,000	44
Population (M)	453	8

Source: International Data Corporation and World Times, 1997

TABLE 4
SPRINTER MARKET DATA

	$M	% of World Data
IT expenditures	50,000	8
Telecom expenditures	23,000	15
GDP	4,000,000	14
Population (M)	509	9

Source: International Data Corporation and World Times, 1997

TABLE 5
STROLLER MARKET DATA

	$M	% of World Data
IT expenditures	28,000	5
Telecom expenditures	25,000	16
GDP	3,500,000	12
Population (M)	3,095	55

Source: International Data Corporation and World Times, 1997

one place in the rankings (see Figure 1).

NET RESULTS: THE INTERNET STORY

Fostering Internet connectivity is the cornerstone for countries building an information society. In the 12 months passed since the first *ISI*, the Internet has become *equated* with the information society. The 55 countries studied in the *ISI* have responded to the hype with vigor (and in doing so with such vigor have served to create more hype and thus have spawned a self-fulfilling prophecy of Internet growth).

The world aggregate *ISI* score for Internet service providers increased 134% from 1996 to 1997. This variable exhibited the greatest growth of any of the 20 *ISI* variables measured. The second-fastest grower was the Internet hosts per capita variable, which grew 55%. The growth in these variables is remarkable but certainly not unbelievable given the nascence of the Internet industry.

Telephone technology, however, is not in the nascent stages of development, yet the variable for the number of lines per household managed a 4.5% increase. An encouraging sign in the 1997 *ISI* results is found in the telephone line error rate variable. Scores in this variable increased 16% from 1996 to 1997.

The results in telephone line error rates are important to the growth and acceptance of the Internet as the cornerstone for the information society because the majority of businesses and consumers rely on telephone lines for their connectivity. High fault rates during telephone connections mean inconsistent transmission of data packets. This is especially discouraging as the sizes of files to be transferred increases. Nations must continue to improve phone lines for businesses to rely on Internet technology for mission-critical applications (including sales transactions) and for fickle home users to embrace the Internet as an entertainment platform (see Figure 2).

ISPs IN THE ISI

The United States advanced to the top of the ISP score in the 1997 *ISI*, improving from fifth place in 1996. Although nearly all nations in the *ISI* exhibited some growth — and the nations with high scores exhibited triple-digit growth — the United States' 318% growth was enough to vault to the top (see Figure 3).

The ISP category is one of the few *ISI* variables in which advanced nations exhibit growth rates stronger than many of their underdeveloped counterparts. This does not mean that ISP development is a rich-get-richer industry; less privileged nations are merely a little slow to take off. The highest growth in ISP scores came from nations that primarily are "middle-of-the-pack" *ISI* finishers (see Figure 4).

Russia, Argentina, Colombia, and Brazil all finished in the "thirty-something" ranks and were classified as Sprinters or high-end Strollers in the *ISI* taxonomy. The nations shown in Figure 4 improved their rank in the ISP category dramatically over 1996. Russia improved 20 spaces in rank in this category, followed by Canada and Argentina, which improved 17 spaces. Brazil, Turkey, and Colombia also improved significantly over their peers.

THE KOREAN EQUATION: DOES IT ADD UP?

In the previous issue of *The Gray Sheet,* Korea stood apart from the rest of the world in its appetite for Web products and services. It led the world in anticipated Web access penetration for business sites, it led the world in per-site Web spending (real and projected), and it ranked third in corporate home page penetration.

So where is Korea in the *ISI* Internet statistics? Buried. It ranked 29th in Internet hosts per capita and 32nd in ISPs. Why? The answer may be found in data IDC collected regarding hosting practices for businesses around the world. Only about 25% of Korean business with a Web presence hosted their own site; nearly 70% relied on ISPs to do the job.

What does this mean for Web services providers?

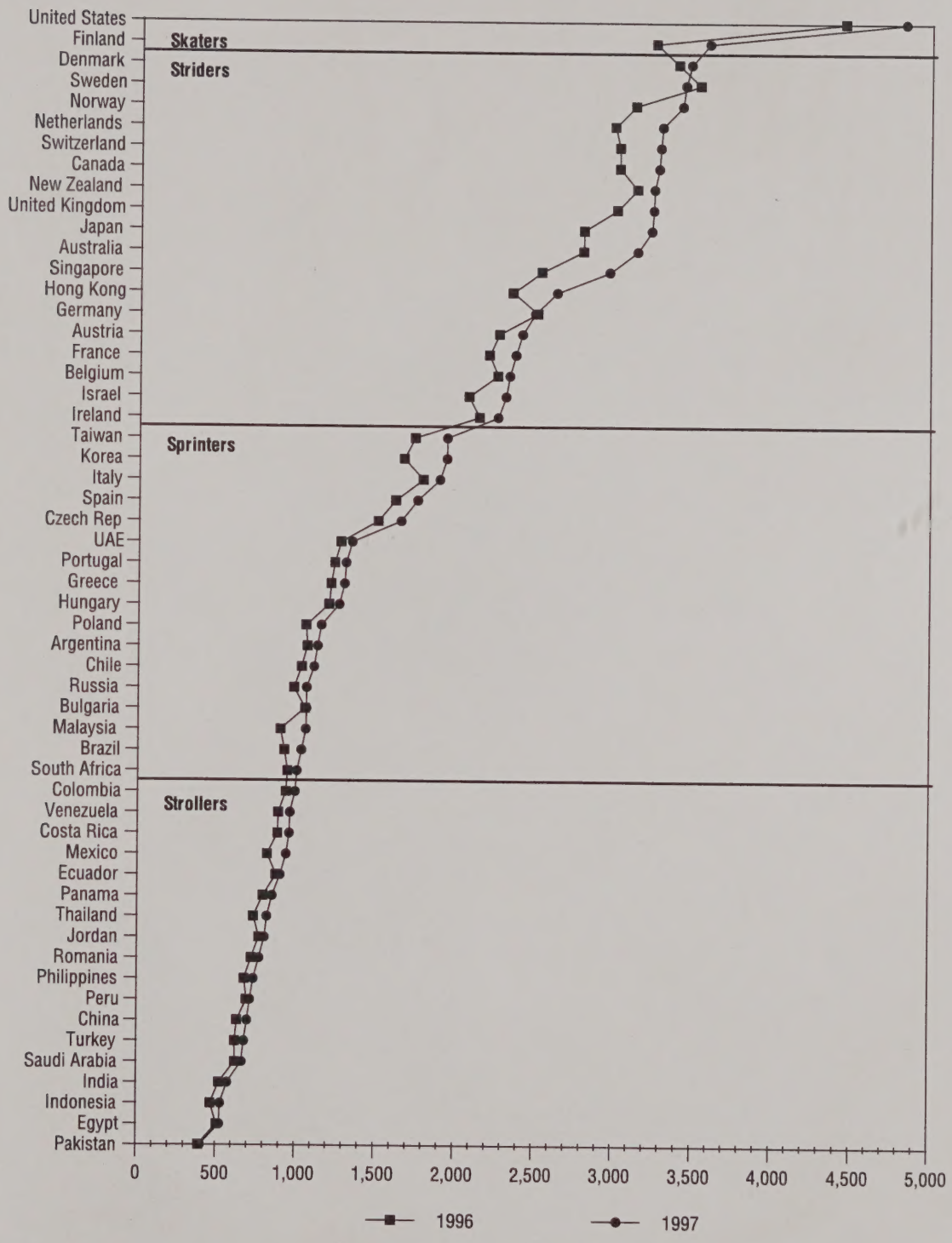
A + B should equal $! Korea believes strongly in the Internet. Korea does not have a large population of indigenous ISPs. Therefore someone else is doing the job.

ISI INTERNET HOST SCORES

The Internet hosts per capita variable was a battle of the traditional superpowers. Finland and Norway remained the top scorers in this category, and Australia and Sweden took advantage of slower growth in the United States and New Zealand to advance into the elite (see Figure 5)

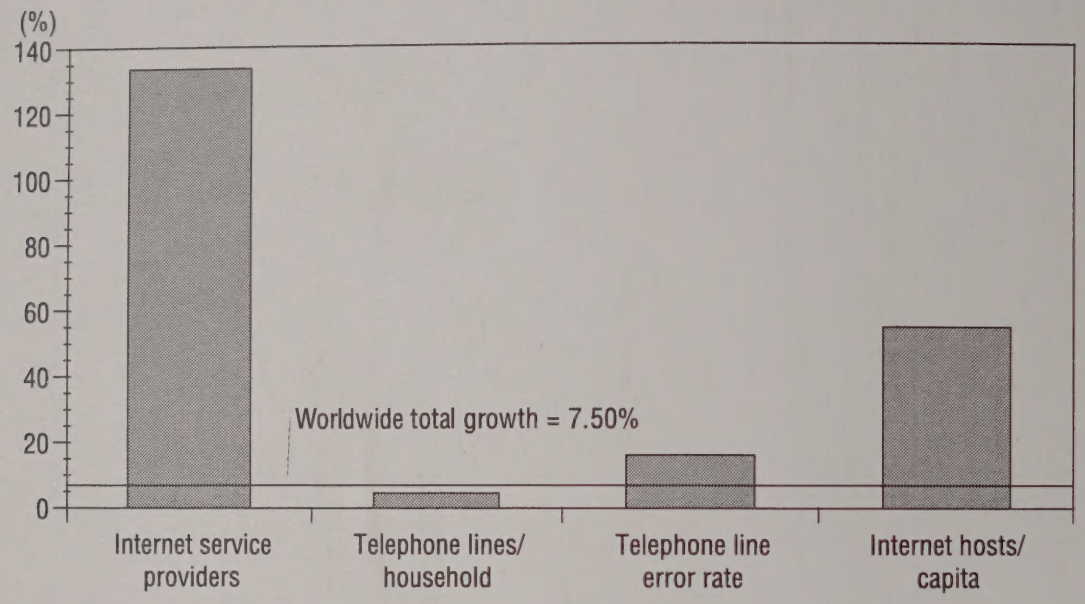
The fastest growth in Internet hosts per capita, much like the growth in ISPs, is found in middle-of-the-pack *ISI* finishers (see Figure 6). Malaysia, Bulgaria, Russia, and the United Arab Emirates all finished among the 16 Sprinters. Colombia and Brazil narrowly missed this category.

FIGURE 1
INFORMATION SOCIETY INDEX STROLLERS, SPRINTERS, STRIDERS, AND SKATERS, 1996 AND 1997



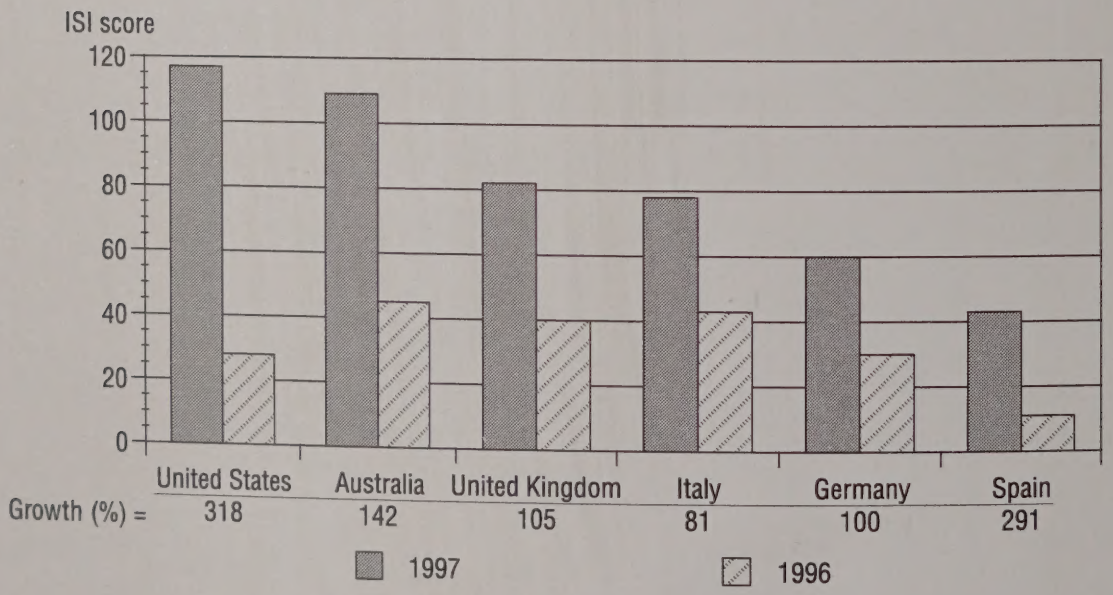
Source: International Data Corporation and World Times, 1997

FIGURE 2
GROWTH IN WORLDWIDE INTERNET-RELATED ISI VARIABLES, 1996–1997



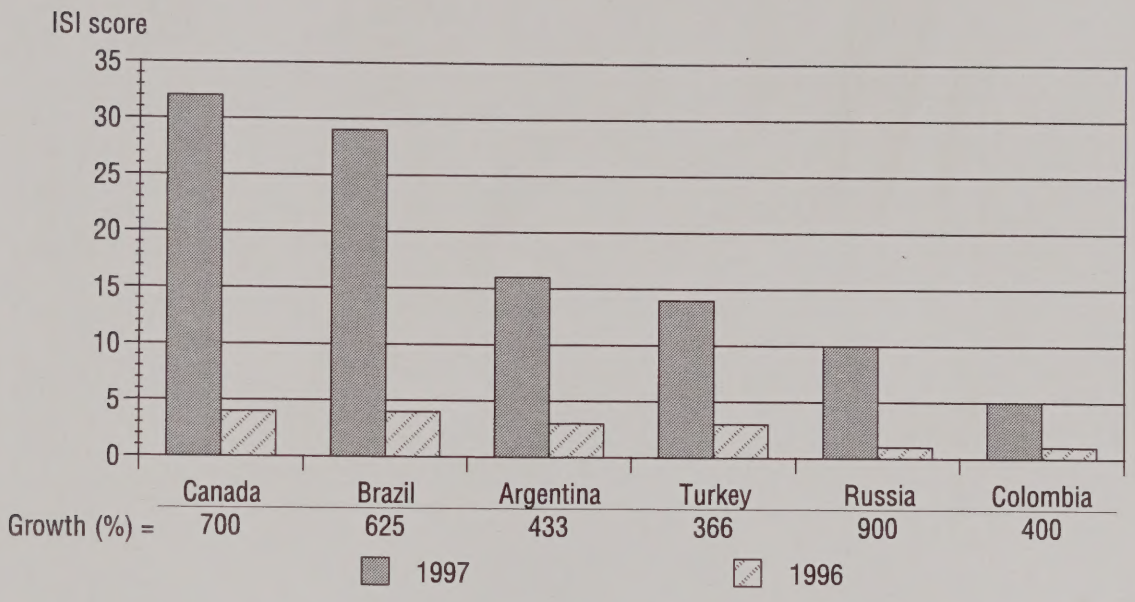
Source: International Data Corporation and World Times, 1997

FIGURE 3
TOP SIX SCORERS IN ISI ISP VARIABLE, 1996 AND 1997
(AS RANKED BY 1997 SCORE)



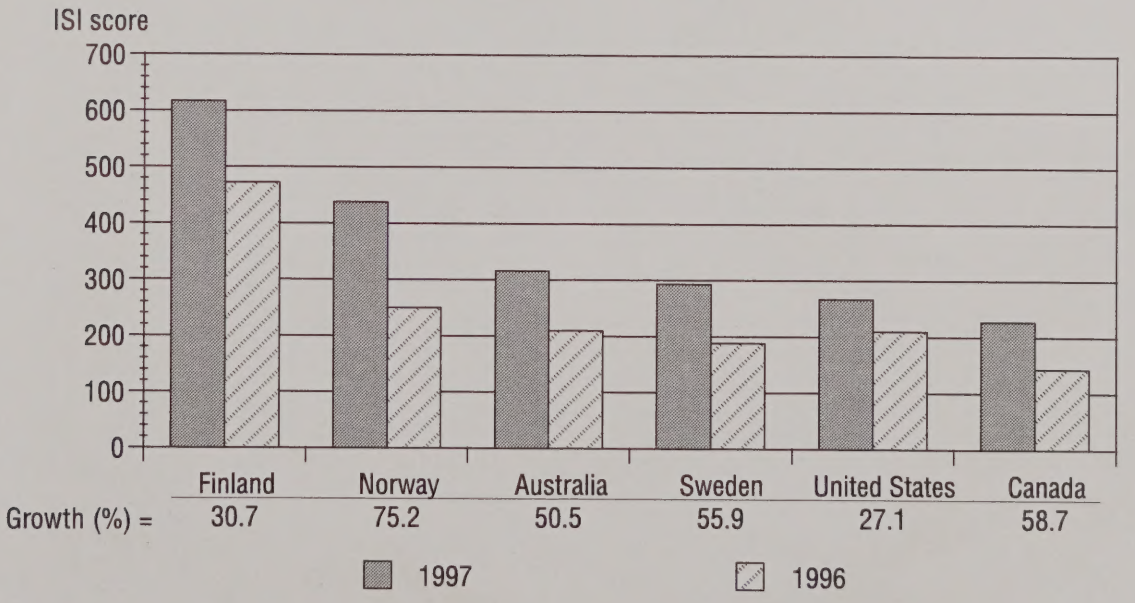
Source: International Data Corporation and World Times, 1997

FIGURE 4
GROWTH SPURTS: ISP SCORES GREW DRAMATICALLY IN SEVERAL NATIONS, 1996 AND 1997



Source: International Data Corporation and World Times, 1997

FIGURE 5
TOP SIX SCORES IN ISI INTERNET HOSTS PER CAPITA VARIABLE, 1996 AND 1997 (AS RANKED BY 1997 SCORE)



Source: International Data Corporation and World Times, 1997

Telephone Lines per Household

Because the telephone industry is more mature and stable than the blooming Internet industry, the rankings for the number of telephone lines per household grew much slower in comparison. Hong Kong, Singapore, and the United States led this variable in 1996 and continued to do so in 1997. Canada and Sweden traded places, and Israel was the only new entry into the top six scorers for this *ISI* measure (see Figure 7).

The telephone-lines-per-household variable is a good indicator of consumer perceptions of the Internet. Although households may choose to install a second phone line for several reasons, one factor influencing this decision is the need to keep voice traffic flowing while exchanging data between the household and outside destinations. In developed countries, the growth in telephone lines per household correlates with multiple lines.

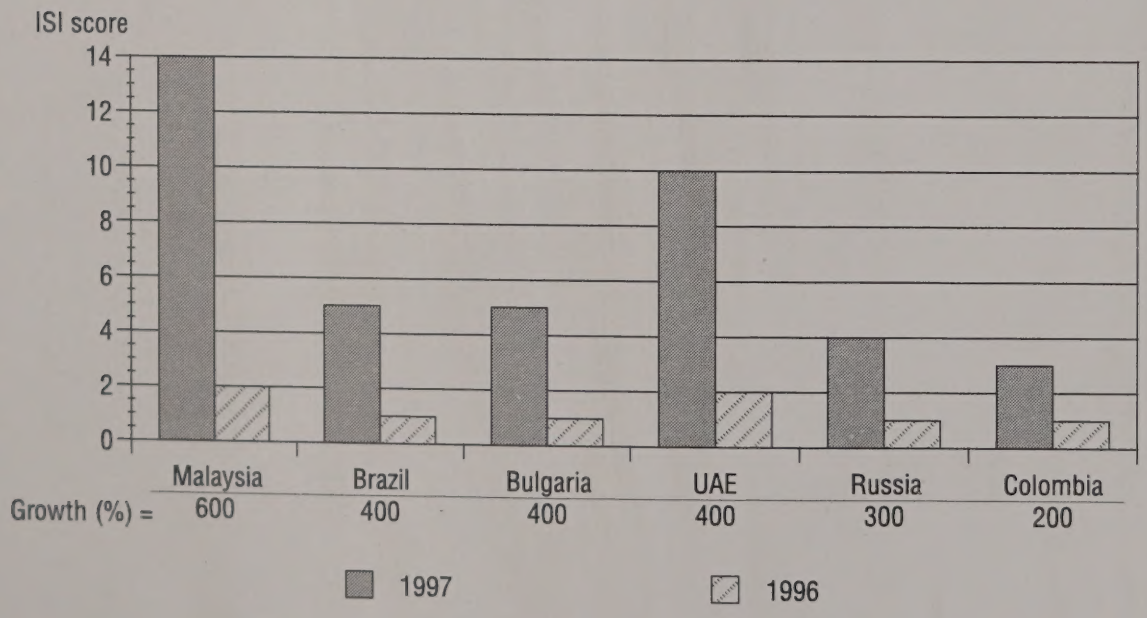
The story differs in underdeveloped nations. China, Peru, and Costa Rica show the highest growth of all nations in the telephone-lines-per-household variable because many homes in these countries have yet to buy their first telephone line (see Figure 8). Public perception in these countries is swaying toward the need to get connected. As these nations develop their information infrastructure, they will be the growth leaders for the *ISI* Internet variables examined in the above sections of this newsletter. Although line-per-household growth will slow, these nations too will begin to adopt multiple lines per household.

ISI Scores for Faults per Telephone Line

The state of the phone lines has a direct effect on the development of the Internet and its corresponding information society. The UAE and Spain score well in this category, with UAE retaining its number-one ranking from 1996. Oddly enough, the United States doesn't even score in the top six in this variable. The rapid growth in data traffic will require the United States and all countries to continue to expand line capabilities.

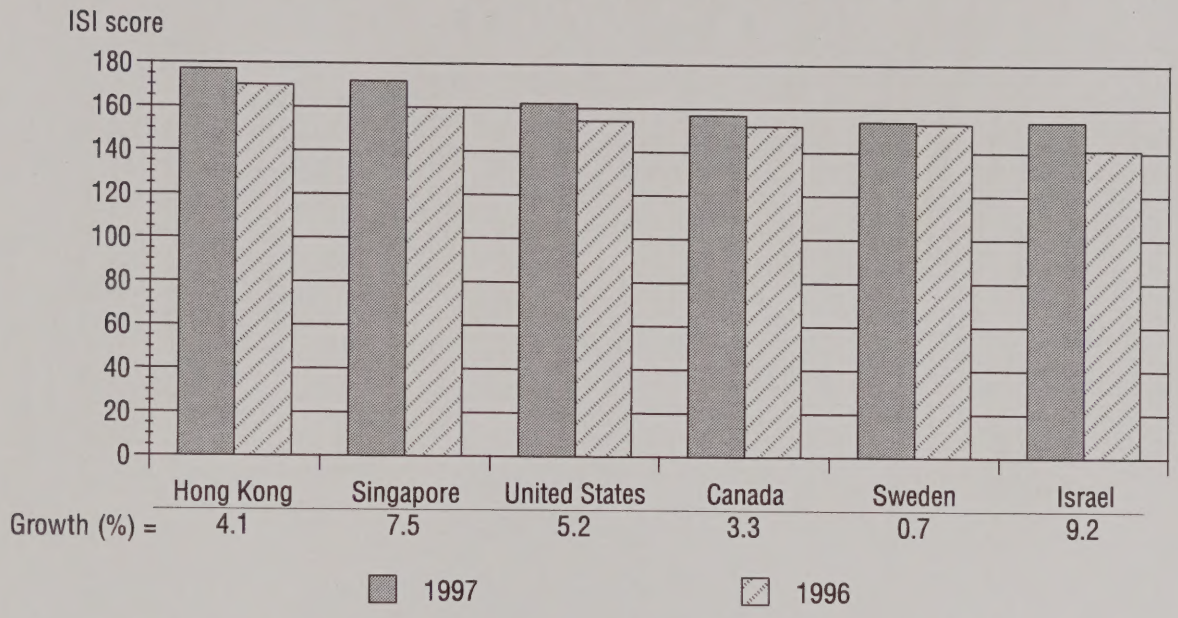
Some tremendous growth occurred in *ISI* line fault scores. Mexico and the Czech Republic scored triple-digit growth in this category. Switzerland and Germany improved the quality of their phone infrastructure as well, as did most other European nations faced with deregulation, and the Philippines and Taiwan showed strong growth in Asia/Pacific (see Figure 10).

Figure 6
High Growth Host Scores, 1996 and 1997



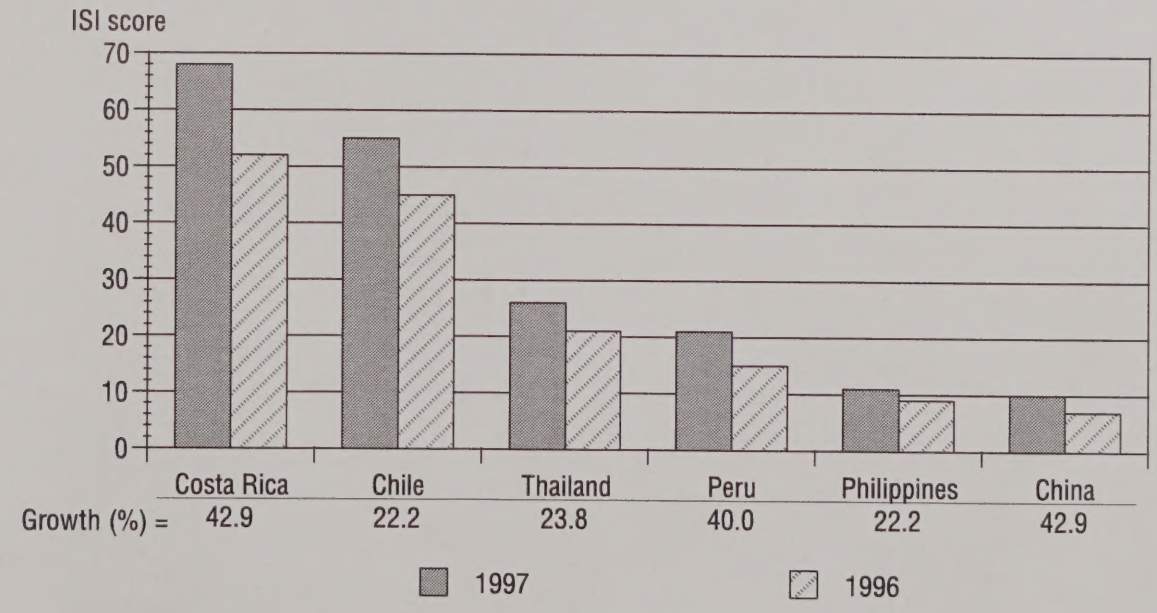
Source: International Data Corporation and World Times, 1997

FIGURE 7
TOP SIX SCORES IN TELEPHONE LINE PER HOUSEHOLD VARIABLE, 1996 AND 1997 (AS RANKED BY 1997 SCORE)



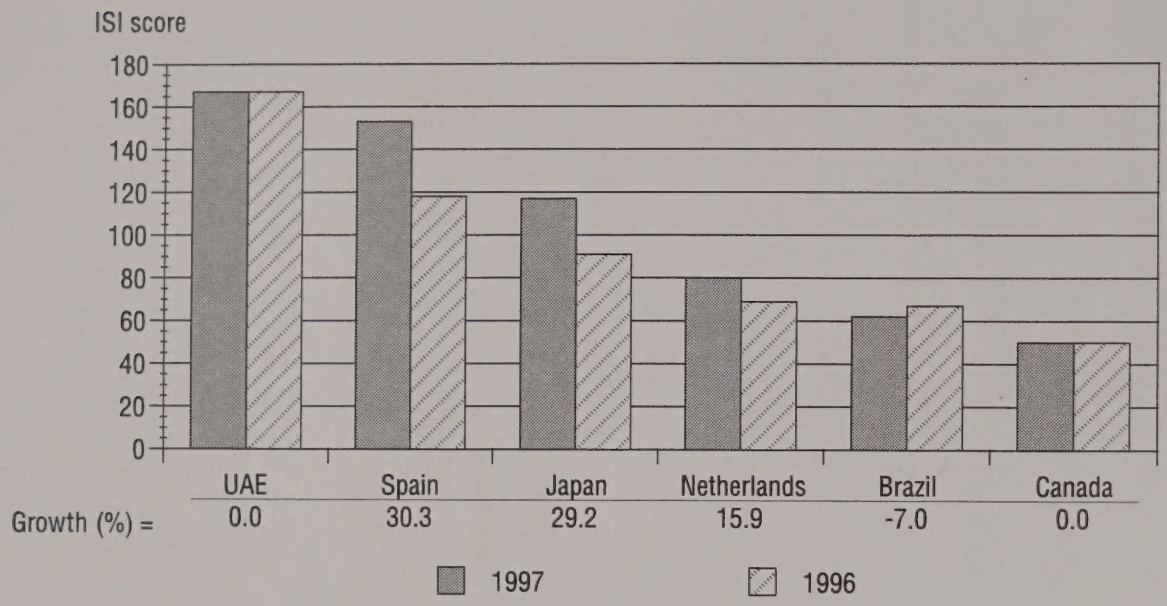
Source: International Data Corporation and World Times, 1997

FIGURE 8
HIGH GROWTH IN TELEPHONE LINES PER HOUSEHOLD, 1996 AND 1997



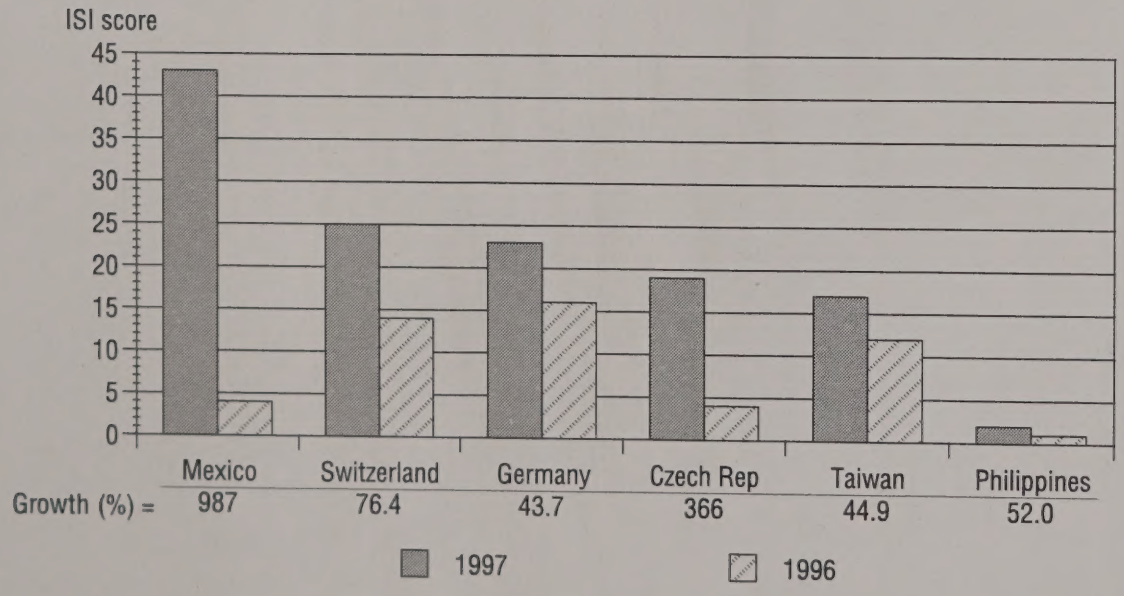
Source: International Data Corporation and World Times, 1997

Figure 9
Top Six Scores in Telephone Line Fault Variable, 1996 and 1997 (as Ranked by 1997 Score)



Source: International Data Corporation and World Times, 1997

Figure 10
Purifying the Pipeline: Most Improved ISI Telephone Faults-per-Line Scores



Source: International Data Corporation and World Times, 1997

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Computer Industry Report

THE GRAY SHEET

Global market intelligence on the information technology industry since 1964.

Pick the Planet's Pockets: Specific Opportunities for Internet Vendors

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November 1, 1997
IDC #14808
Vol. 32, No. 16–17

From the opening kickoff of football season this year, caustic comedian Dennis Leary has been scowling out from America's TV screens and goading mainstream U.S. business to "work the Web" as he pitches Internet products for IBM. Perhaps his intended audience needs an even ruder wake up call.

Although no one can deny that the Internet offers a lot of opportunity here in the States, recent research indicates that other regions of the world are hopping on the cyber bandwagon with aplomb. The implications of Internet acceptance are manifold and affect everyone from the smallest Internet startup company to the largest of national governments.

The Internet offers corporations tremendous profitability leverage – enough leverage to reorder the leadership ranks in every industry. Likewise, countries and regions whose businesses embrace the Internet will find themselves at the top of the world economy, which is migrating toward an irreversible reliance on information technology (IT).

The leverage provided by IT and catalyzed by the Internet facilitates a concept IDC calls "Internet leapfrog." This leapfrog metaphorically illustrates the surpassing of established economic powers (read: the United States) by heretofore smaller but more nimble entities.

Who might be the first players in the game of Internet leapfrog? Nations that are composed of Internet-savvy corporations will be the first beneficiaries of a power shift. Sweeping national technology initiatives may expedite the acceptance of IT in burgeoning countries, but ultimately a nation's businesses as a collective whole must leverage the Internet and outmaneuver their foreign opponents to bring the riches of the global economy to local shores.

Come what may of the new world order, countries that have high concentrations of businesses with positive attitudes about the Internet represent

THE GRAY SHEET
Associate Editor
Rick Miller

Production
IDC Publishing Services & Technologies

Editorial Advisers
Lloyd Cohen, John Gantz, David Vellante, Gigi Wang, Bruce Stephen, Frank Gens, Doug McLeod

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573, Oxon Hill, MD 20750-0573

■

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something besides the seeds of change: They represent specific pockets of opportunity for Internet products and services providers.

This double issue of *The Gray Sheet* provides insight regarding attitudes toward Internet adoption in businesses by country and by industry segment — to illustrate global trends *and* specific pockets of profit for Internet vendors. Some key findings include the following:

- Business sites in Asia/Pacific nations put the greatest importance on having an Internet strategy, with Korean sites attributing the most importance of any nation overall.
- Keeping true to their beliefs, Korean sites spent the most (on average) on Internet products and services in 1996 and are forecast to spend the most in 2000.
- Singapore led all nations in Web access (on average), with slightly less than 60% of all business sites connected. The United States was second, but both nations are forecast to lose position in 1997.
- Germany showed the greatest zeal for Web access in 1997, with nearly *all* business sites in the finance, transportation/communications, and government/health industries anticipating being online by yearend.

IDC's *Global IT Survey* polled business sites from 15 countries* and a variety of industry segments (including government and education) to determine attitudes and adoption patterns for a panoply of IT products and services. The data presented in this issue of *The Gray Sheet* is based on the responses from executives at these business sites.

Note: Finland, Sweden, and Norway are grouped as one "country" called Scandinavia.

A more detailed presentation of this data is available in IDC report #14411, *Pockets of Profit,* released by IDC's Internet program this fall.

THE INTERNET: JUST HOW IMPORTANT IS IT?

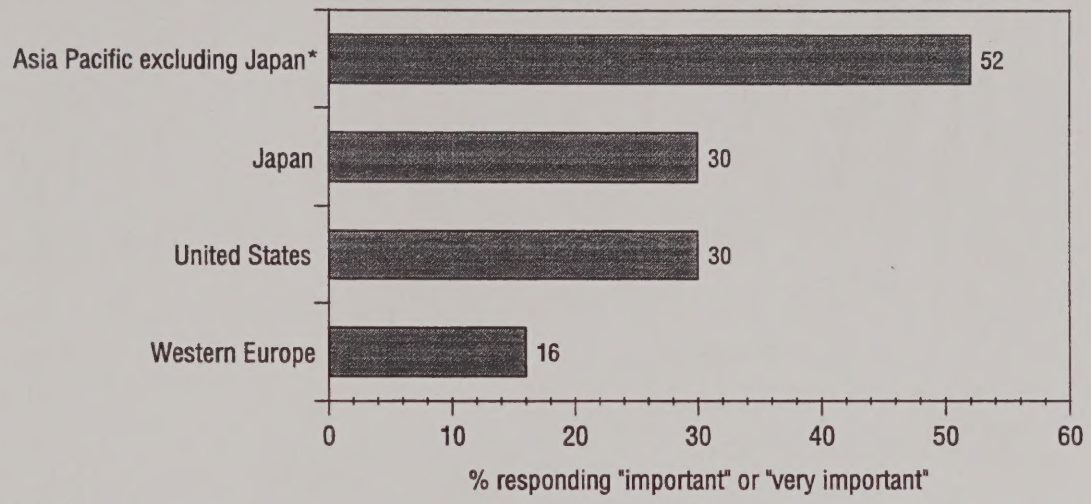
The first suggestion that smaller nations could eclipse the United States and its first-world neighbors in the new economy is manifest in business site attitudes regarding Internet strategy. Although the powers of the West care about the Internet, they aren't yet agog by it's business applications.

No region exhibited the enthusiasm for the Internet that Asia/Pacific did. The region's average importance rating for creating an Internet strategy was 52%, head and shoulders above the importance attributed by businesses in United States and Japan. Businesses in Western Europe attributed little importance to establishing an Internet strategy in 1997, and the region's average would have sagged further if it wasn't buoyed by Scandinavia's 22% rating (see Figure 1).

At the country level, Asia/Pacific swept the rankings. The top six countries, measured by the level of importance they placed on Internet strategy, hail from Asia/Pacific (see Figure 2).

FIGURE 1:
PERCEIVED IMPORTANCE OF AN INTERNET STRATEGY BY REGION, 1997

Question: Please rate the importance of an Internet strategy.



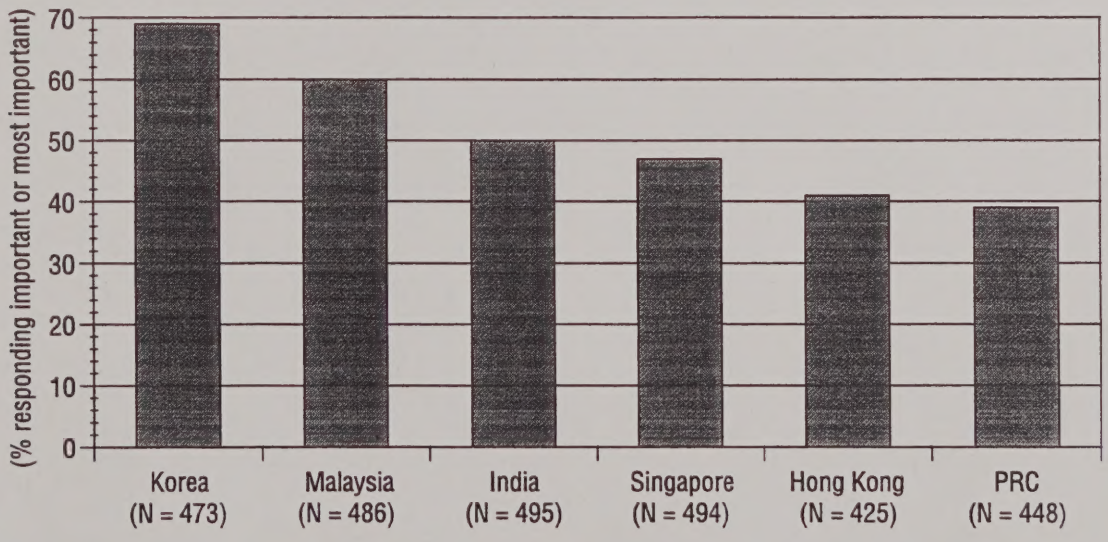
N = 11,186

*Asia/Pacific excluding Japan, includes: China, Hong Kong, India, Korea, Malaysia, Singapore

Source: IDC *1997 Global IT Survey*

FIGURE 2:
COUNTRIES WITH HIGHEST PERCEIVED IMPORTANCE OF AN INTERNET STRATEGY, 1997

Question: On a scale from 1 to 5 (5 = most important), how do you rate Internet strategy as an IT issue?



Source: IDC's *1997 Global IT Survey*

Internet Spending: Korea Waves Its Magic Won

Another determinate of Internet acceptance is quantified by how much money sites spend on Internet products and services. Who is taking the Internet seriously and investing in it? Follow the dollars (or perhaps more appropriately, the other currencies).

IDC queried business sites about their level of spending on Web-based systems and services in 1996 and their anticipated spending in 1997. (Spending includes internal salaries and services as well as external equipment, software, and services.)

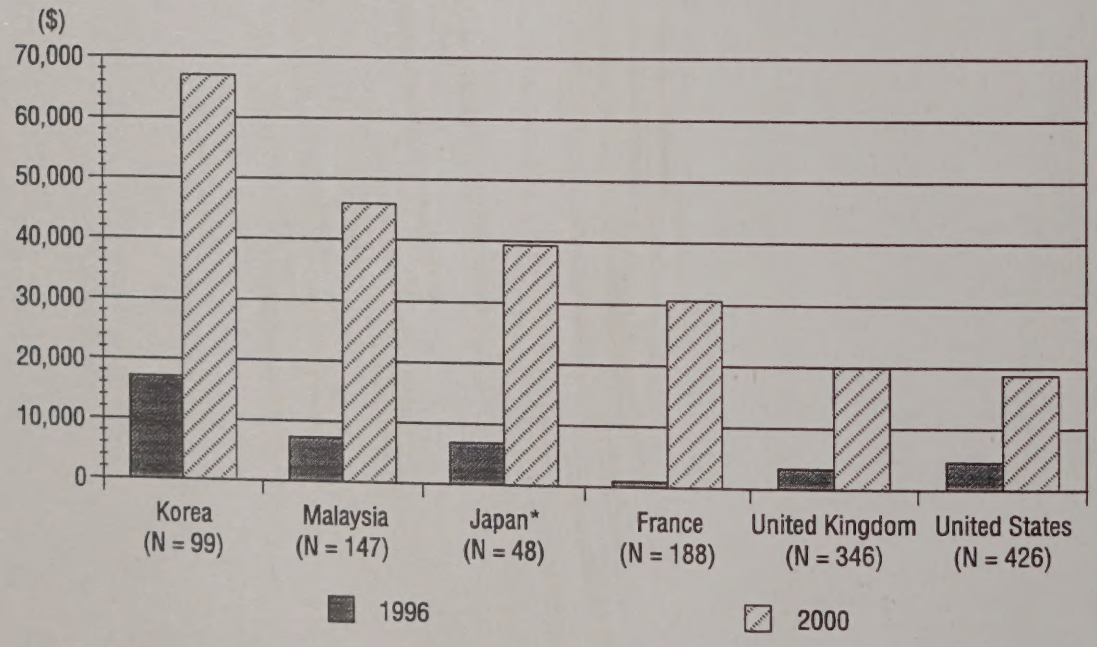
In 1996, the mean spending on the Internet for all sites in the *Global IT Survey* was $4,000. This spending per site will increase dramatically by 2000 to $20,500 (see Figure 3). To many readers, these per-site spending figures may appear small. One must remember that more than 90% of business sites worldwide have fewer than 100 employees; in fact, most have fewer than 10 employees. As will be evident in the subsequent figures, certain regions and business segments will spend far more than the global mean.

On average, business sites in Asia/Pacific countries spend the most on Web-related products and services. Korea and Malaysia spent $17,000 and $7,000 per site, respectively, in 1996. Per site, the United States was the fourth-largest spender on Web-related products in 1996, but it drops in rank to sixth behind the United Kingdom and France in 2000. Germany, which was the sixth-largest spender per site in 1996, doesn't appear in the figure because it is forecast to fall out of the top spenders by 2000. France and Hong Kong advance.

Even though extreme values were excluded from the data, several nations exhibit astounding triple-digit growth

Figure 3: Big Spenders: Anticipated Per-site Spending On Web-Related Products by Country in 2000 vs. 1996 (Ranked by Spending in 2000)

Question: Please estimate the amount of overall IT spending per site being devoted to Web-related systems (including hardware, software, consulting and services)



* Japan's survey sample comprised small businesses only. In all likelihood, responses from large business sites would have increased spending estimates.

Source: IDC's *1997 Global IT Survey*

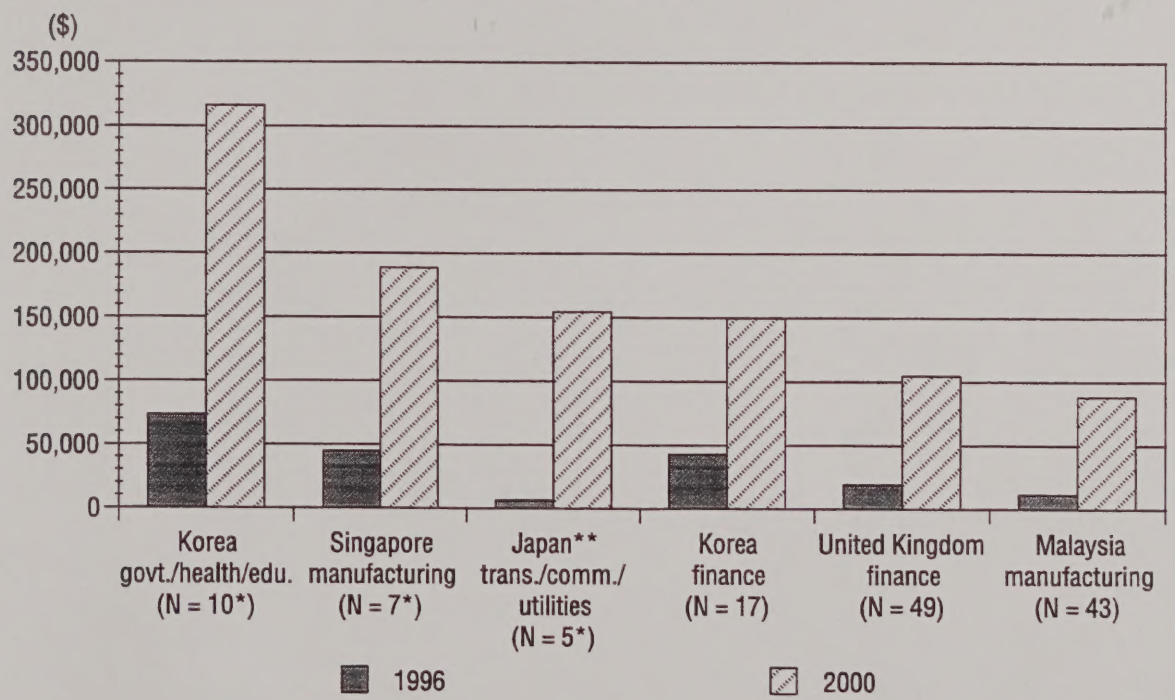
compounded annually, 1996–2000. However, Internet vendors and opportunists should be aware that large growth does not directly equate to large opportunity. India will grow 191% each year, 1996-2000 (equal to 7030% growth total), but in raw totals the numeric growth is small – $10 spent per site in 1996 to $713 spent per site in 2000. On the other hand, France also exhibits remarkable growth in Web-related spending for the 1996-2000 period (140% compounded annually; 3265% total growth), but business sites there represent significant financial opportunity. French sites spent $911 in 1996 on Web-related products and services; they will spend more than $30,000 per site in 2000.

The portion of Web-spending budgets allocated to external spending in Asia/Pacific business sites should interest some international Internet products vendors. The majority of Asian nations spend 60% or more on external Web-related products and services and less than 40% on internal costs. Only Singapore breaks trend and spends a mere 54% on external goods.

These figures imply a hunger for products or consulting services rather than a need to devote budgets to in-house staff. In short, although the appetite these "have-not" countries exhibit for adapting the Internet to business applications should raise concerns in the governments of the global "haves," these same appetites should raise global Internet vendors' sense of opportunity.

FIGURE 4:
MORE BIG SPENDERS: ANTICIPATED PER-SITE SPENDING ON WEB-RELATED PRODUCTS BY INDUSTRY SEGMENT AND COUNTRY IN 2000 VS. 1996 (RANKED BY SPENDING IN 2000)

Question: Please estimate the amount of overall IT spending per site being devoted to Web-related systems (including hardware, software, consulting and services)



* IDC cautions readers about extrapolating trends from survey data with N values smaller than 20. However, the industry segments presented here exhibit patterns consistent with their respective country data, for which much larger Ns are available.

** Japan's survey sample comprised small businesses only. In all likelihood, responses from large business sites would have increased spending estimates.

Source: IDC's *1997 Global IT Survey*

To Be Specific

The largest opportunities in specific business segments parallel the findings at the country level. Not surprisingly, a Korean industry leads the list of big spenders, and another places fourth. The United Kingdom's finance industry and Japan's transportation/communications industries also demonstrate strong Web-related spending on a per-site basis.

No industry appeared prevalent in its Web-spending tendencies (see Figure 4 on previous page).

High-Level Access

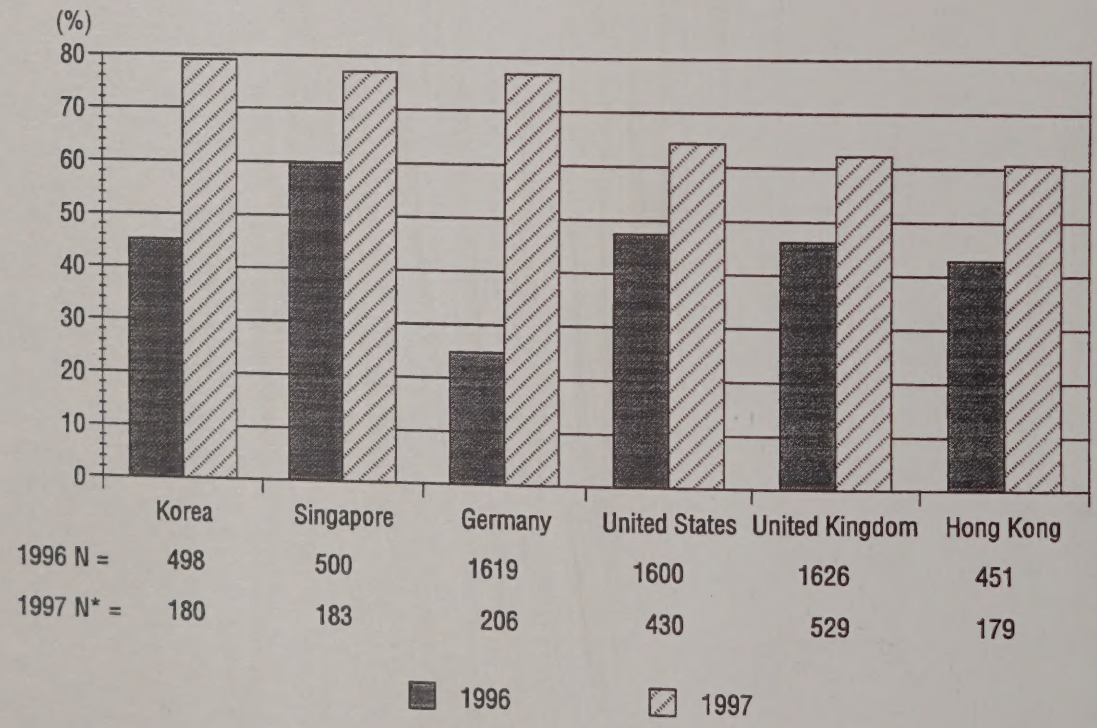
The need for Web access is something that most countries can agree upon. The reasons are clear: Where else can companies find out vital information about competitors in other markets instantly from their employees' desktops? Where else can they share information around the country, region, or world without setting up a dedicated infrastructure? The basic value of the Internet and World Wide Web as communication and information media is validated by the rapid worldwide adoption of Web access by the commercial community.

For vendors selling products complementary to Web access - Web connectivity itself, modems and data communications equipment, browsers, etc. - the ripest opportunity is evident in the markets with the greatest Web access rates. Although 41% of all business sites had access in 1996, the drive to take part in the information society is proceeding fast and furious. Globally, the percentage of sites with access will expand to nearly 60% by the end of 1997.

The battle for the title of "most connected country" is particularly heated. In 1996, 60% of business sites in Singapore had connectivity to the World Wide Web; this rate exceeded all other nations in the survey. However, Singapore's reign at the top is tenuous at best (see Figure 5).

Figure 5:
Penetration of World Wide Web Access in Business Sites by Country, 1996 and 1997 (Ranked by 1997 Access)

Question: Does your business site have access to the World Wide Web?



* 1997 N value based on respondents who did not have access in 1996.

Source: IDC's *1997 Global IT Survey*

By the end of 1997, survey responses indicate the percentage of Singapore business sites with Web connectivity will be eclipsed by connectivity rates in Korea. And Germany is closing fast. The United States, which had the second-highest connectivity rate in 1996, will fall to fourth by yearend 1997.

The dramatic shifts in the order of "connected" nations is directly attributable to the ferocity with which some countries are approaching the Internet in 1997. Germany's business site connectivity rate was outside the top 10 in 1996, but a remarkable 70% of sites that didn't have a Web connection last year claimed they would have one by the end of 1997. True to form, Korea (62%) also reported a large percentage of unconnected sites getting online in 1997. Although 33% of U.S. business sites without a Web connection said they would be getting one by the end of 1997, this effort was relatively languid in comparison with other nations in the study.

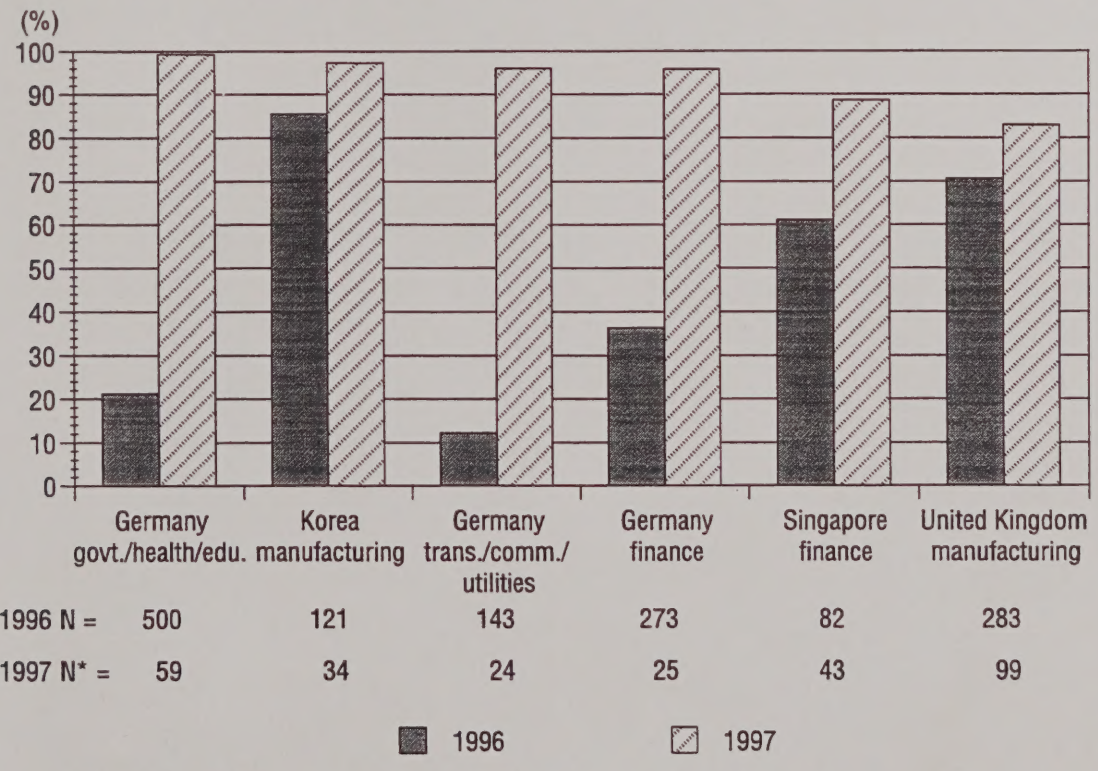
However, the same caveats for vendors apply here as in the Web-related spending section: strong growth is great, but it doesn't completely overshadow opportunity in moderate growth markets with very large critical masses of users. In other words, 33% connectivity growth in the United States may be slower than in Germany or Korea, but it still represents a lot of businesses getting online.

To Be Specific

Breaking the country-level survey results into industry subsegments reveals the source of Germany and Korea's zeal to gain Web access. Three of the top four global industry segments with high Web access penetration rates are found in Germany; the fourth is found in Korea (see Figure 6). Singa-

Figure 6:
Penetration of World Wide Web Access in Business Sites by Country and Business Segment, 1996 and 1997 (Ranked by 1997 Access)

Question: Does your business site have access to the World Wide Web?



* 1997 N value based on respondents who did not have access in 1996.

Source: IDC's *1997 Global IT Survey*

pore's finance industry and the United Kingdom's manufacturing industry also show signs of near total Web penetration.

Virtually *all* business sites in Germany's finance, transportation/communications/utilities, and government/health/education industry subsegments that did not have Web access in 1996 said they'd be getting it by year-end 1997. The only factor that prevents IDC from making the sweeping declaration that all business sites in these German industries will be connected before 1998 is the trace number of respondents to the survey that did not know or indicate whether their site had Web connectivity.

Interestingly, only one segment in Germany shows little interest in getting connected to the World Wide Web. The manufacturing segment will have slightly less than one-half of its business sites connected to the World Wide Web in 1997 and had less than one-fourth of sites connected in 1996.

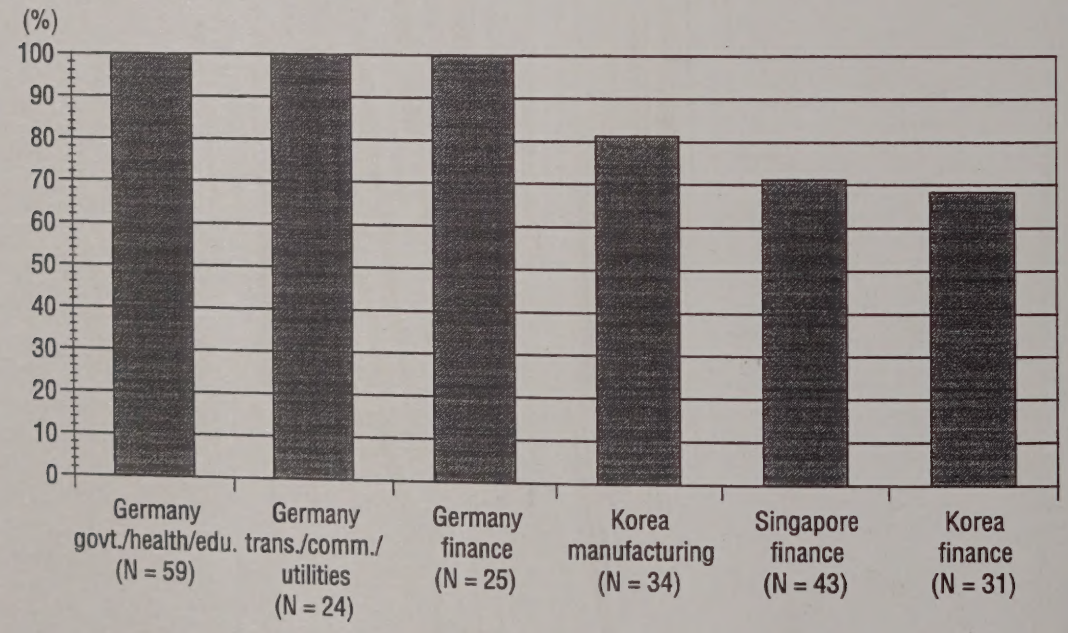
Although no other industry subsegment matched the zeal of the German government, finance, and transportation industries, 81% of unconnected business sites in Korea's manufacturing industry and 71% of unconnected sites in Singapore's finance industry said they would be gaining Web connections in 1997 (see Figure 7).

Home Is Where the Page Is

The World Wide Web provides a twofold value for companies. It presents a ready entry point for a company to obtain marketing and product information, and it serves as a platform for commerce whereby goods and services are bought and sold — and in some cases even delivered — directly on the Internet. Home page penetration shows which countries are best positioned as marketers and, more important, which are best positioned to be the sellers rather than the buyers of Web-offered products. The home page is the first step in creating a storefront

Figure 7: Aggressive Adopters: Industry Segments With the Highest Anticipated Adoption Rates for Web Access in 1997, by Country

*Question: Does your site plan to access the World Wide Web in 1997?**



* Based on respondents who did not have access in 1996.
Source: *IDC's 1997 Global IT Survey*

to the world. Home page penetration says a great deal about a country's commerce readiness. As this analysis reveals, not all countries or regions are equally commerce ready. In fact, the distribution of home page platforms throughout the world is very uneven.

The global penetration for home pages was 18% of all companies (in the countries surveyed) in 1996. By 1998, 40% of companies will have a home page.

One would expect the United States to be at the forefront of Internet home page penetration, but not so. The nation that invented the Internet ranked no better than sixth in home page penetration in 1996, with slightly less than 17% of businesses having home pages. By 1998, the United States is anticipated to drop to eighth place in home page penetration, with 42% of companies having a home page, and thus doesn't even appear in the top home page penetration listings in Figure 8.

Malaysian companies were most likely to have a home page (47%) in 1996, and Japan followed distantly (31%). These countries are forecast to maintain their one-two rankings through 1998. The Asia/Pacific region (not counting Japan) places four countries in the top six for anticipated home page penetration

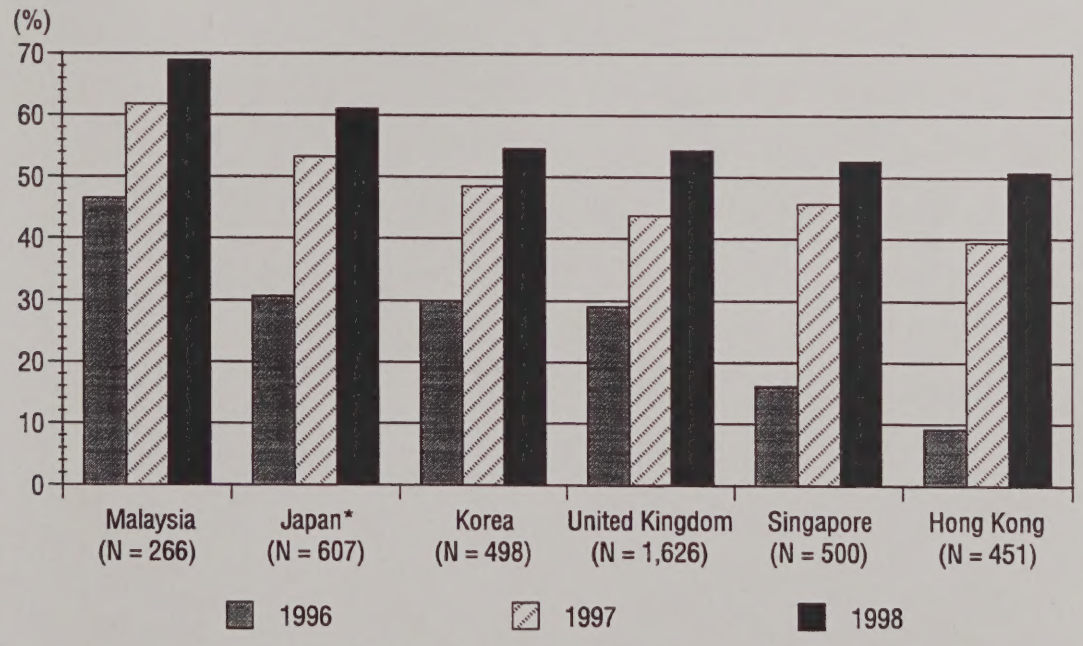
One country noticeably absent from the top of the home page penetration rankings is Germany. The nation with the most aggressive adoption trend for Web access comes in dead last in home page penetration. Only 8% of German businesses had a home page in 1996. Things don't improve much through 1998, when 17% of companies will have a home page; as a result, Germany will remain last in this category.

To Be Specific

The industry subsegment with the highest penetration of home

FIGURE 8:
HOMEWARD BOUND: CORPORATE HOME PAGE PENETRATION RATES BY COUNTRY, 1996-1998 (BY ANTICPATED 1998 PENETRATION)

Question: Does your company maintain a home page on the World Wide Web? If not, when will it implement one?



* Japan's survey sample comprised small businesses only. In all likelihood, responses from large business sites would have increased penetration estimates.

Source: IDC's *1997 Global IT Survey*

pages, on the local level, is Korea's transportation/communications/utilities industry segment. More than 75% of companies in this segment have a home page. The manufacturing industry in the United Kingdom gives chase, with slightly more than 73% of companies having a home page.

One might expect Malaysia, the nation with the highest home page penetration, to have a host of industry subsegments with high penetration as well. Although only one Malaysian segment makes the top six in 1998, the remaining segments are very close behind, indicating a keen interest in the Internet throughout the Malaysian business population (see Figure 9).

No industry segment data was available for Japan at press time.

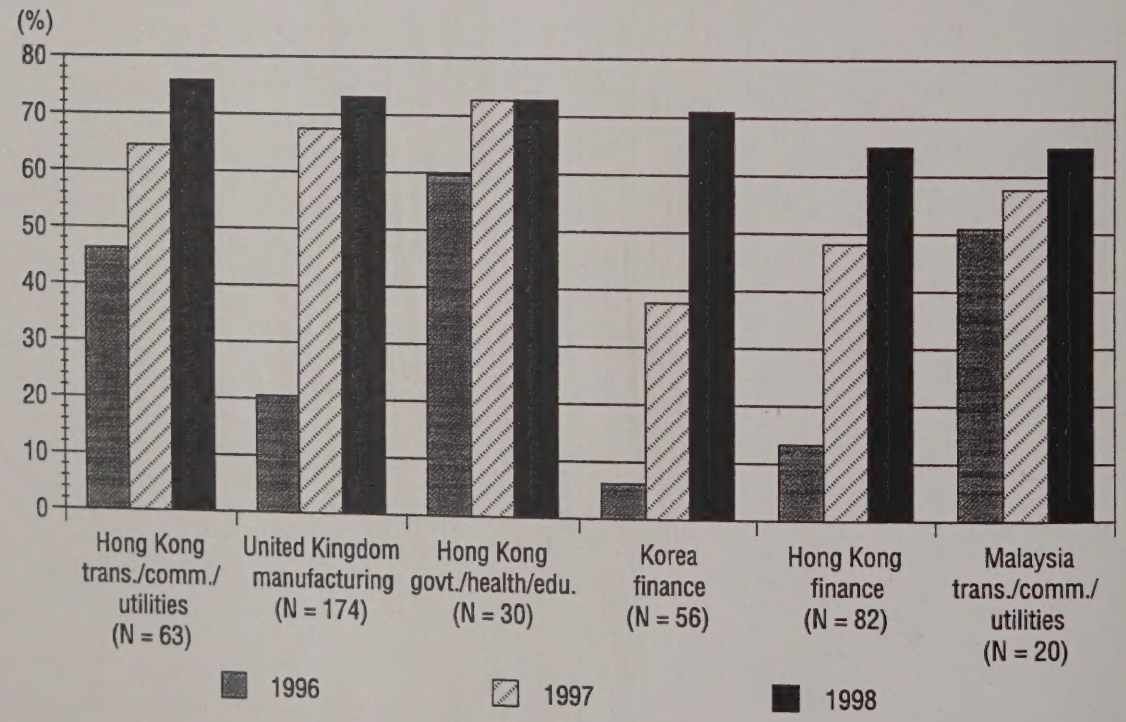
THE HOST WITH THE MOST

Where the Internet or Web site is hosted indicates two key items for IT suppliers offering Internet products: First, it indicates the user company's commitment to the Internet because hosting requires a significant investment in technology and personnel. Second, it indicates the nature of the market and whether the primary prospects are individual sites, company consolidation sites, or Internet service providers.

Examining the hosting practices of the countries and segments with the greatest home page penetration, one can find variances in the methods with which businesses establish their presence on the Internet. Korean businesses were far and away more likely to use an Internet service provider than the other countries profiled here (see Figures 10 and 11). The United Kingdom showed an inordinate number of respondents who did not know who hosted their home page.

FIGURE 9: CORPORATE HOME PAGE PENETRATION RATES BY COUNTRY AND INDUSTRY SEGMENT, 1996–1998 (BY ANTICPATED 1998 PENETRATION)

Question: Does your company maintain a home page on the World Wide Web? If not, when will it implement one?

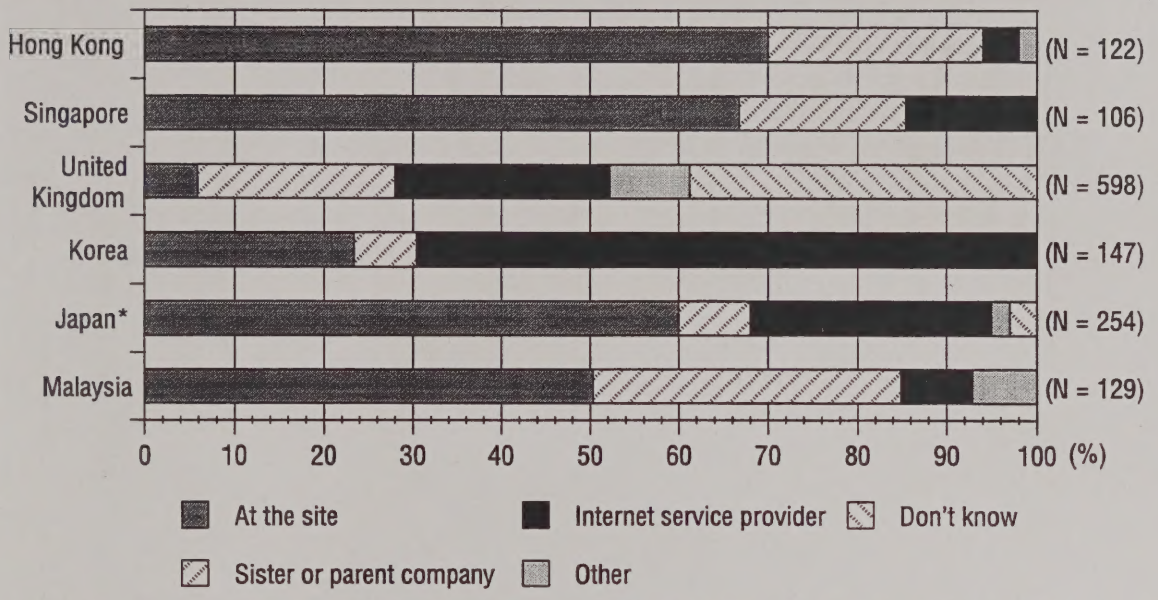


Note: No industry subsegment data was available for Japan at press time.

Source: IDC's *1997 Global IT Survey*

FIGURE 10:
HOSTING PRACTICES IN COUNTRIES WITH THE GREATEST HOME PAGE PENETRATION, 1996

Question: Who actually hosts your home page?

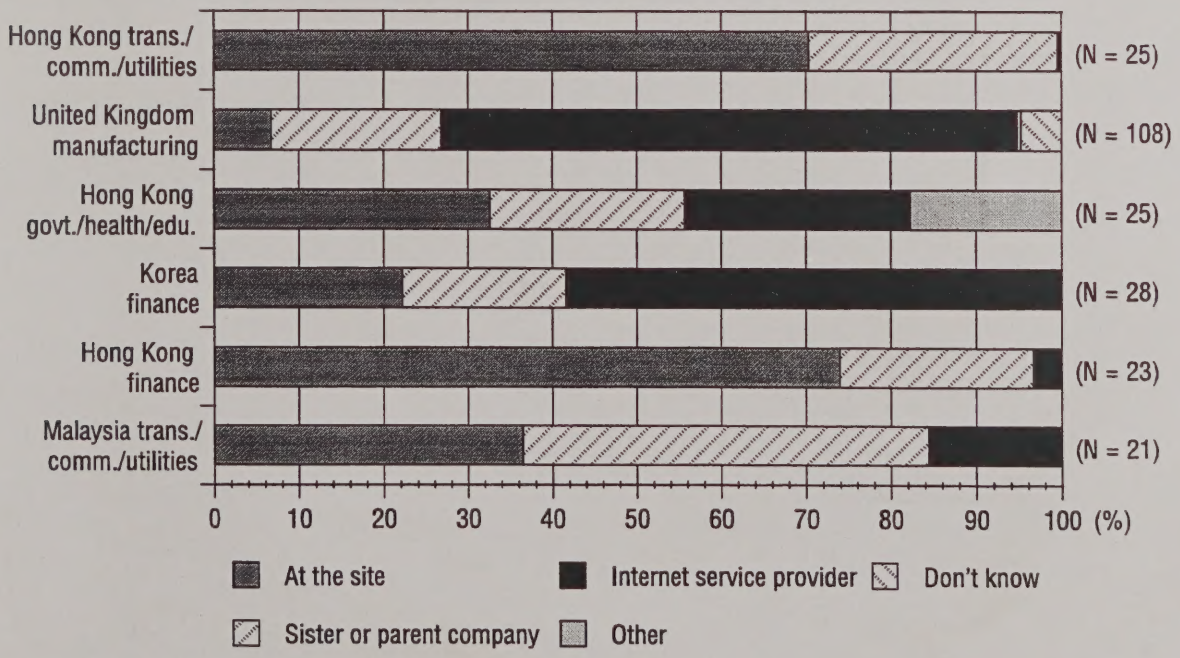


* Japan's survey sample comprised small businesses only. In all likelihood, responses from large business sites would have increased penetration estimates.

Source: IDC's *1997 Global IT Survey*

FIGURE 11:
HOSTING PRACTICES IN INDUSTRY SEGMENTS WITH THE GREATEST HOME PAGE PENETRATION BY COUNTRY, 1996

Question: Who actually hosts your home page?



Note: No industry subsegment data was available for Japan at press time.

Source: IDC's *1997 Global IT Survey*

WIELDING THE WEB: BUSINESS APPLICATIONS FOR THE INTERNET

One of the biggest questions Internet vendors must answer to take advantage of all the opportunities the Internet represents can be summarized as follows: What will customers use the Internet for?

In an effort to pinpoint opportunity to very specific segments, this section of *The Gray Sheet* will present two sets of data: business functions that will garner the most IT investment in 1997, and business functions that were performed via the Internet in 1996. Given these two sets of data, one has the parameters of a matrix on which to plot the potential profit afforded by each area of opportunity.

More simply put, if 20% of respondents from a country or business segment indicated they used the Internet to perform marketing functions (hypothetically speaking), and 50% of the same population indicates marketing will receive the primary attention from the IT budget in 1997, one can infer a greater likelihood that Internet products targeted at marketing functions will find acceptance in this niche than in a niche that did not use the Internet for marketing or does not plan on investing any of its IT budget in marketing-related concerns.

The forthcoming matrices make no effort to quantify the opportunity in each niche in dollars because spending amounts for each business function are not available. Instead these matrices show the general probability that users will demand Internet products to meet the needs of the specific business functions profiled.

According to the parameters of the matrix, the greatest opportunity would be found in a business function (e.g., marketing) receiving mention from 100% of respondents as the primary IT beneficiary and 100% of respondents using the Internet to perform said function.

What will customers use the Internet for? This section of The Gray Sheet will present two sets of data: business functions that will garner the most IT investment in 1997, and business functions that were performed via the Internet in 1996.

IT SPENDING PRIORITIES

On the global average, respondent's expected accounting and financial applications received the lion's share of IT spending budgets in 1997 – 11% of respondents named this business function as receiving the most attention when IT budgets are divvied up. Inventory management was the second most popular choice as prime IT beneficiary (less than 8% of respondents).

Neither of the aforementioned applications lend themselves to Internet use. (Inventory management may become a staple function of 'extranets' in the near future, but it was not selected as a popular Internet application in the *1997 Global IT Survey.*)

However, the third and fourth mentions as "application of greatest IT investment" do lend themselves to the Internet utilization - customer support and sales transactions, respectively. More than 6% of respondents indicated customer support functions would receive the most IT investment in 1997 and nearly 6% of respondents indicated sales transaction processes would receive the most IT attention. Another business application that is streamlined through the use of the Internet is marketing, which more than 4% of respondents indicated would be the number-one target of IT dollars in 1997.

These percentages may appear small, but given the plethora of business applications IT implementers could devote their funds to, these small pockets of opportunity are noteworthy.

INTERNET USES

Respondents indicated the business processes mentioned above were applied to the Internet in varying degrees in 1996. Globally, 36% of business sites used the Internet to perform marketing functions in 1996; 34% used it to aid in customer support. Only 16% of respondents said they used the Internet for sales transactions in 1996*. The number-one business application respondents applied the Internet to was market research (47%), but this factor does not appear in the matrices because it was not a factor to which users indicated they would devote portions of their overall IT budget.

**Note: Respondents were allowed multiple answers to the*

question, "What functions did your site perform on the Internet in 1996?"

PICKING THE POCKETS: THE COUNTRY LEVEL

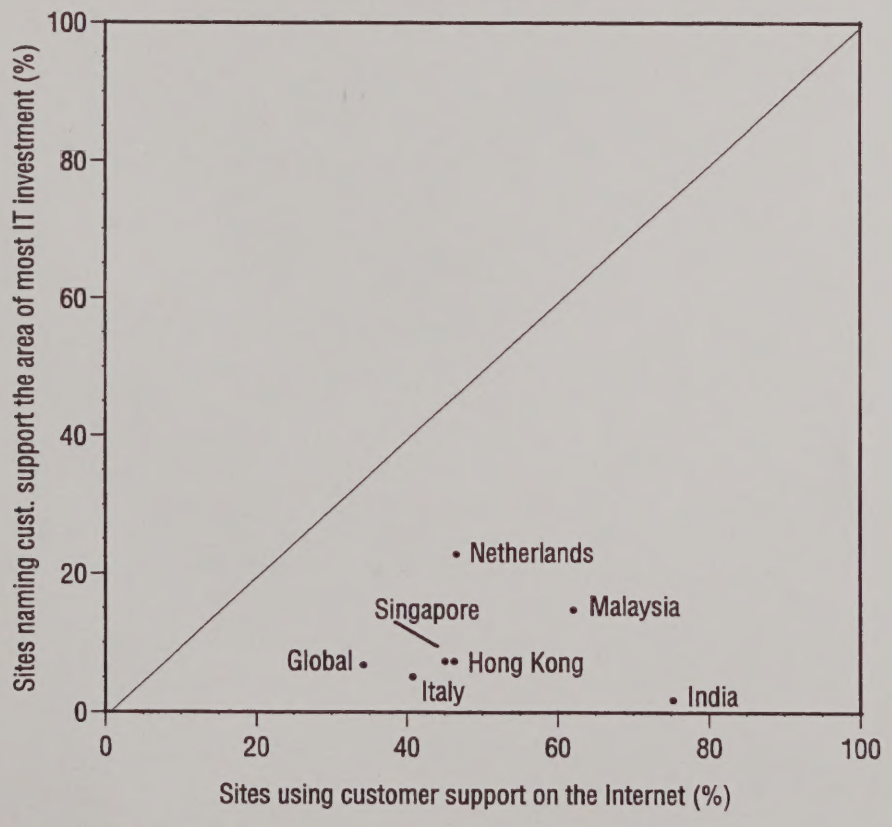
IDC believes significant opportunities for Internet products exist in three distinct business applications: customer support, placing/taking sales transactions, and marketing. Vendors will enjoy success marketing Internet products that cater to these business activities – and the greatest success will be found in specific geographic areas.

India leads all nations in opportunity for Internet products related to customer support. A remarkable 75% of all sites in India who use the Internet to perform business activities used the 'Net to aid in customer support. Only about 2% of *Global IT Survey* respondents from the same sample (Internet users) plan to devote a priority of their IT budget to customer support (be it Internet-enabled customer support or some other type of customer support).

In the Netherlands, 23% of sites said customer support would get the most attention when IT budgets are divided up in 1997, and 47% of sites used the Internet for customer support functions in 1996 (see Figure 12).

FIGURE 12: OPPORTUNITY MATRIX FOR CUSTOMER SUPPORT ON THE INTERNET, BY COUNTRY

Questions: Which business applications did your site use on the Internet in 1996?
Which business application will receive the greatest IT investment in 1997?



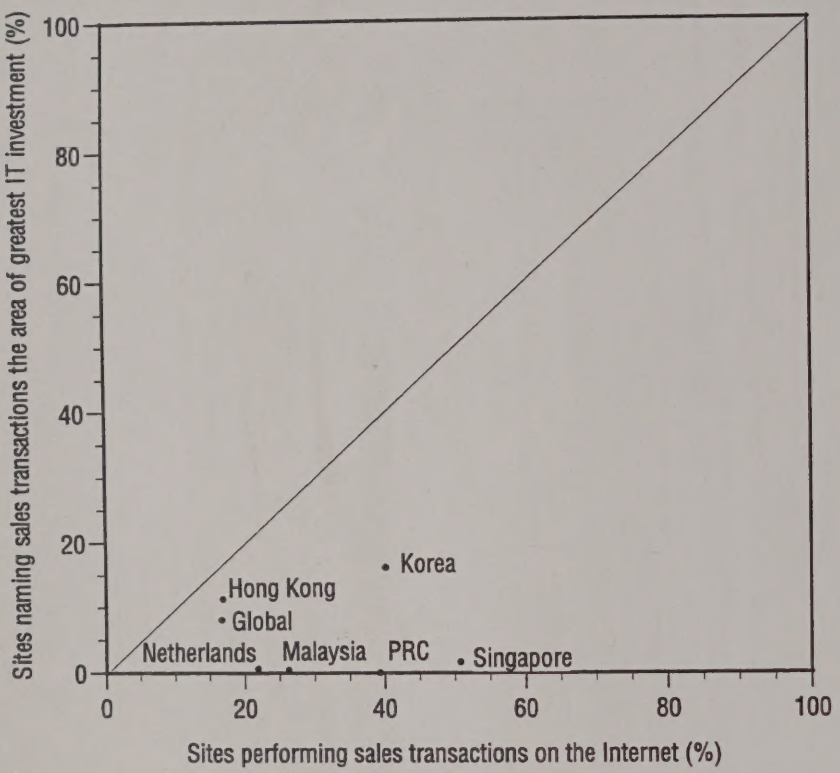
N values: India = 124; Malaysia = 246; Netherlands = 196; Hong Kong = 214; Singapore = 299; Italy = 518; Global = 5,150.

Note: N value based on respondents that used the Internet to perform at least one business function in 1996.

Source: IDC's *1997 Global IT Survey*

FIGURE 13: OPPORTUNITY MATRIX FOR SALES TRANSACTIONS ON THE INTERNET, BY COUNTRY

Questions: *Which business applications did your site use on the Internet in 1996? Which business application will receive the greatest IT investment in 1997?*



N values: Singapore = 299; Korea = 311; PRC = 129; Malaysia = 246; Netherlands = 196; Hong Kong = 214; Global = 5,150

Note: N value based on respondents that used the Internet to perform at least one business function in 1996.

Source: IDC's *1997 Global IT Survey*

The greatest percentage of business sites using the Internet for sales transactions was in Singapore (51%). However, less than 2% of Singapore sites said sales transaction functions would consume the most IT funding of all possible functions.

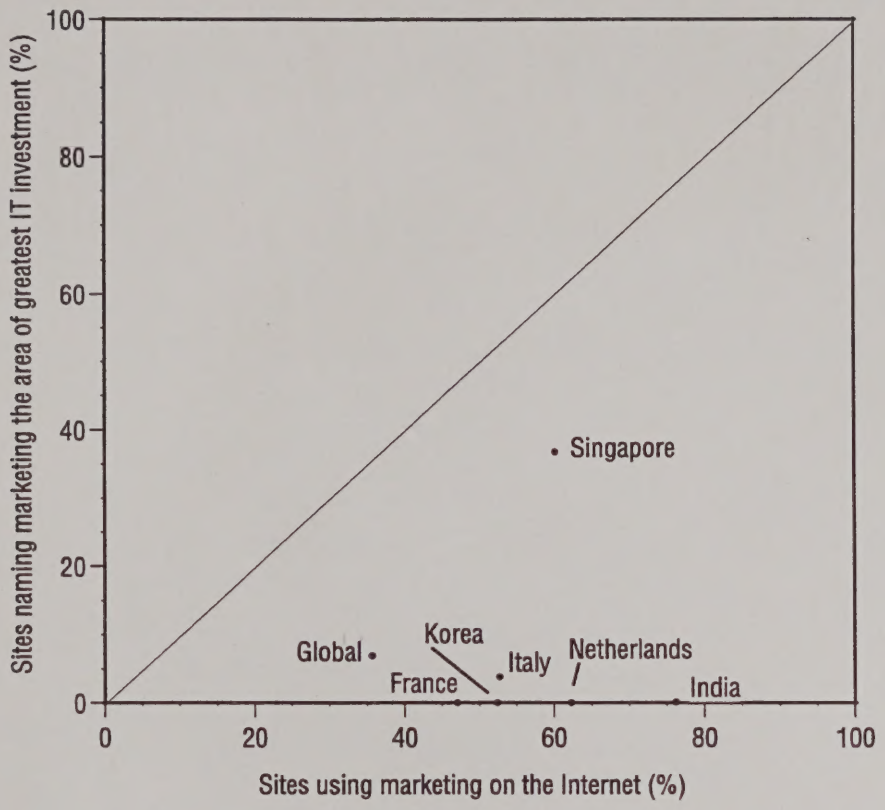
Slightly more than 16% of Korean sites indicated sales transactions functions would receive the lion's share of the IT budget, and 40% of Korean sites used the Internet for sales transactions in 1996 (see Figure 13).

In marketing, India again lead the Internet application category; 76% of India's sites used the Internet for marketing-related activities. Only a scant 0.1% of India's business sites said marketing would receive the most attention regarding the IT budget.

Singapore respondents indicated 37% of sites prioritized marketing when the IT dollars are to be doled out in 1997. More than 60% of sites used the Internet to perform marketing related functions in 1996 (see Figure 14).

FIGURE 14:
OPPORTUNITY MATRIX FOR MARKETING ON THE INTERNET

Questions: Which business applications did your site use on the Internet in 1996?
Which business application will receive the greatest IT investment in 1997?



N values: India = 124; Singapore = 299; Netherlands = 196; Italy = 518; Korea = 311; France = 540; Global = 5,150

Note: N value based on respondents that used the Internet to perform at least one business function in 1996.

Source: IDC's *1997 Global IT Survey*

HOW TO CONNECT: THE DEMAND FOR ISDN

One tangible Internet opportunity for vendors, if only anecdotal as a global Internet acceptance indicator, is end users' desire for ISDN.

ISDN demand indicates a certain level of Internet savvy because it provides access speeds that exceed conventional phone modem abilities. ISDN also carries a premium price. At present, its adoption is still limited to users who take their Internet connection seriously.

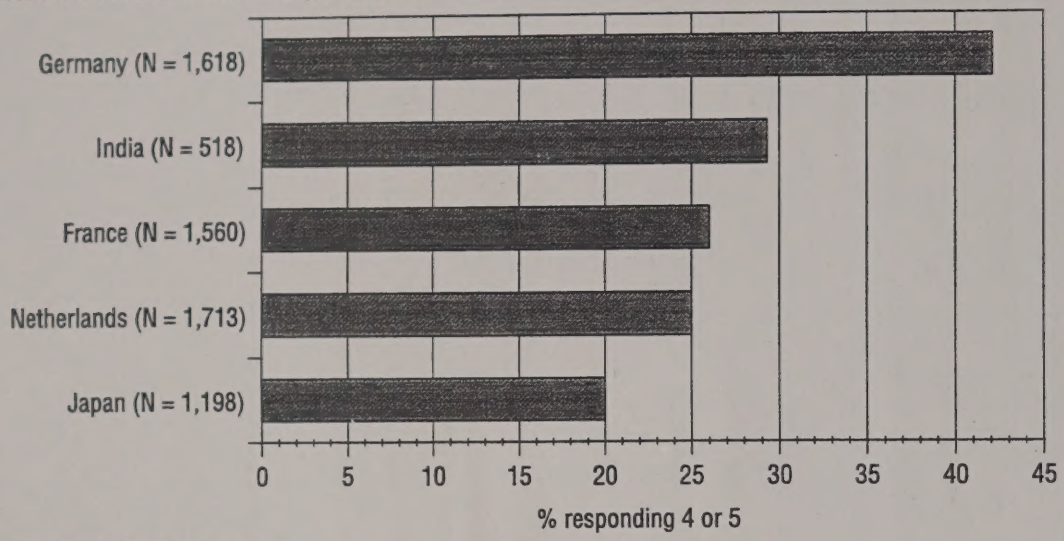
The United States has been slow to accept ISDN primarily because telcos have been slow to promote the technology not because users have an overwhelming lack of interest in the Internet.

As a portent for regional Internet acceptance, ISDN acceptance is somewhat misleading. The United States has been slow to accept ISDN primarily because telcos have been slow to promote the technology *not* because users have an overwhelming lack of interest in the Internet.

Figures 15 and 16 show respondents' strongest acceptance ratings of ISDN.

FIGURE 15: ISDN ACCEPTANCE BY COUNTRY, 1997

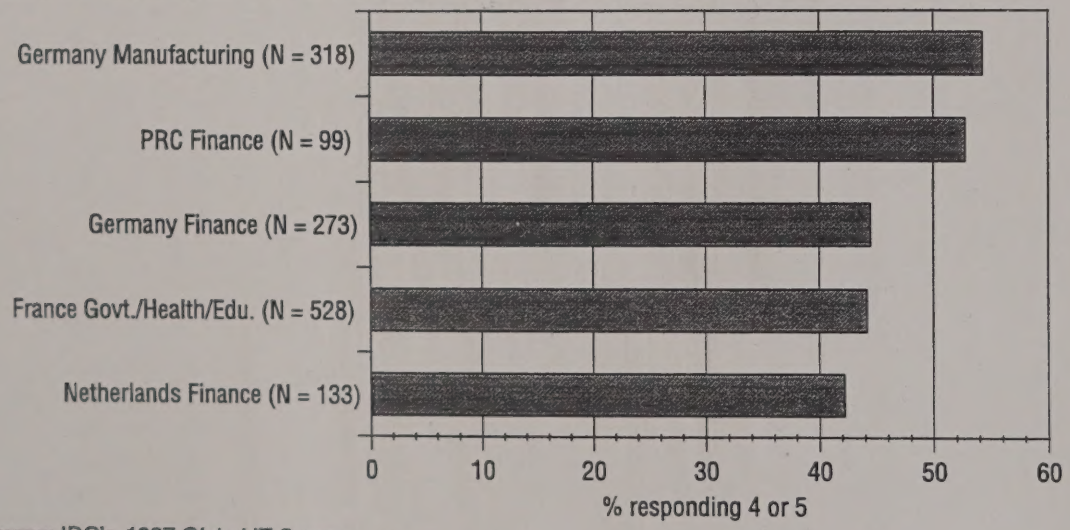
Question: On a scale from 1 to 5 (5 being the heaviest use) how much do you plan to use ISDN in 1997?



Source: IDC's *1997 Global IT Survey*

FIGURE 16: ISDN ACCEPTANCE BY COUNTRY AND INDUSTRY SEGMENT, 1997

Question: On a scale from 1 to 5 (5 being the heaviest use) how much do you plan to use ISDN in 1997?



Source: IDC's *1997 Global IT Survey*

INTERNET DATA AVAILABLE ELECTRONICALLY

The data that comprise the graphs and charts in this issue of *The Gray Sheet* are available for purchase in electronic form. The charts are available in Microsoft Excel format from Janis Dempsey, who can be reached at (508) 935-4145 or **jdempsey@idcresearch.com.** The data for these charts cost $395, and can be delivered via e-mail or floppy disk.

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Computer Industry Report

THE GRAY SHEET

Global market intelligence on the information technology industry since 1964.

Moving at the Speed of Business: The Worldwide Packaged Software Market Adapts to Change and Grows

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Despite the fact that hardware vendors are finding fewer high-growth opportunities in business markets and are turning to the consumer as a revenue stream, software vendors will still find that their pot of gold lies at the end of the corporate rainbow.

However, packaged software vendors must be aware of and respond to the shifting needs in the corporate market if they wish to maintain a competitive edge. Alliances and positioning within the various software "ecosystems" will be key to survival and will help stem the tide of Microsoft's marketing juggernaut.

What are examples of the shifting software needs in today's corporations? Forward-thinking corporations are turning to software solutions to increase revenue, not merely to increase back-office efficiencies — a concept no doubt enhanced by the development of the Internet and the degree of customer intimacy it provides. Forward-thinking corporations are also turning to open standards to provide flexibility in their solutions. The traditional two-tier (client-to-server) solutions are being expanded to three- and four-tier solutions (and more) as generic services are broken out of applications.

Big business's emerging demands for software that addresses needs beyond the back office will affect each aspect of the worldwide market, which IDC breaks into three primary markets: application solutions, application development tools, and system infrastructure software. On a geographic basis, the new trends in software will affect each region differently, with Europe falling slightly behind in share in some markets.

This double issue of *The Gray Sheet* explores the dynamics behind the changing trends in business and how these trends are affecting the various software markets. It also provides review and forecast data on a regional level and investigates

IDC International Data Corporation ■ 5 Speen Street, Framingham, MA 01701 ■ (508) 872-8200

THE GRAY SHEET

Associate Editor
Rick Miller

Production
IDC Publishing Services & Technologies

Editorial Advisers
Donald C. Bellomy Doug McLeod
Lloyd Cohen John Gantz
David Vellante Gigi Wang
Bruce Stephen Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573, Oxon Hill, MD 20750-0573

■

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vendor performance. Key findings from the research include the following:

- The total worldwide packaged software market will nearly double during the forecast period (1996–2001), from $105 billion to $203 billion.
- Geographically, the United States is the leading software consumer, with about 45% of the market. It will extend its share in worldwide packaged software by about two points during the forecast period.
- Independent software vendors dominate the top-10 packaged software suppliers, but system vendor IBM retains top-software-vendor status.
- The applications solutions segment is by far the largest of the software segments, but its relationship to the development tools and system infrastructure segments is incestuous: Battles in the system infrastructure segment (e.g., Unix vs. NT) and developments in the tools segment all affect the growth of the applications market.
- The home segment accounted for only about one-twentieth of the worldwide packaged software market in 1996.

BUSINESS REENGINEERING EQUALS SOFTWARE REENGINEERING

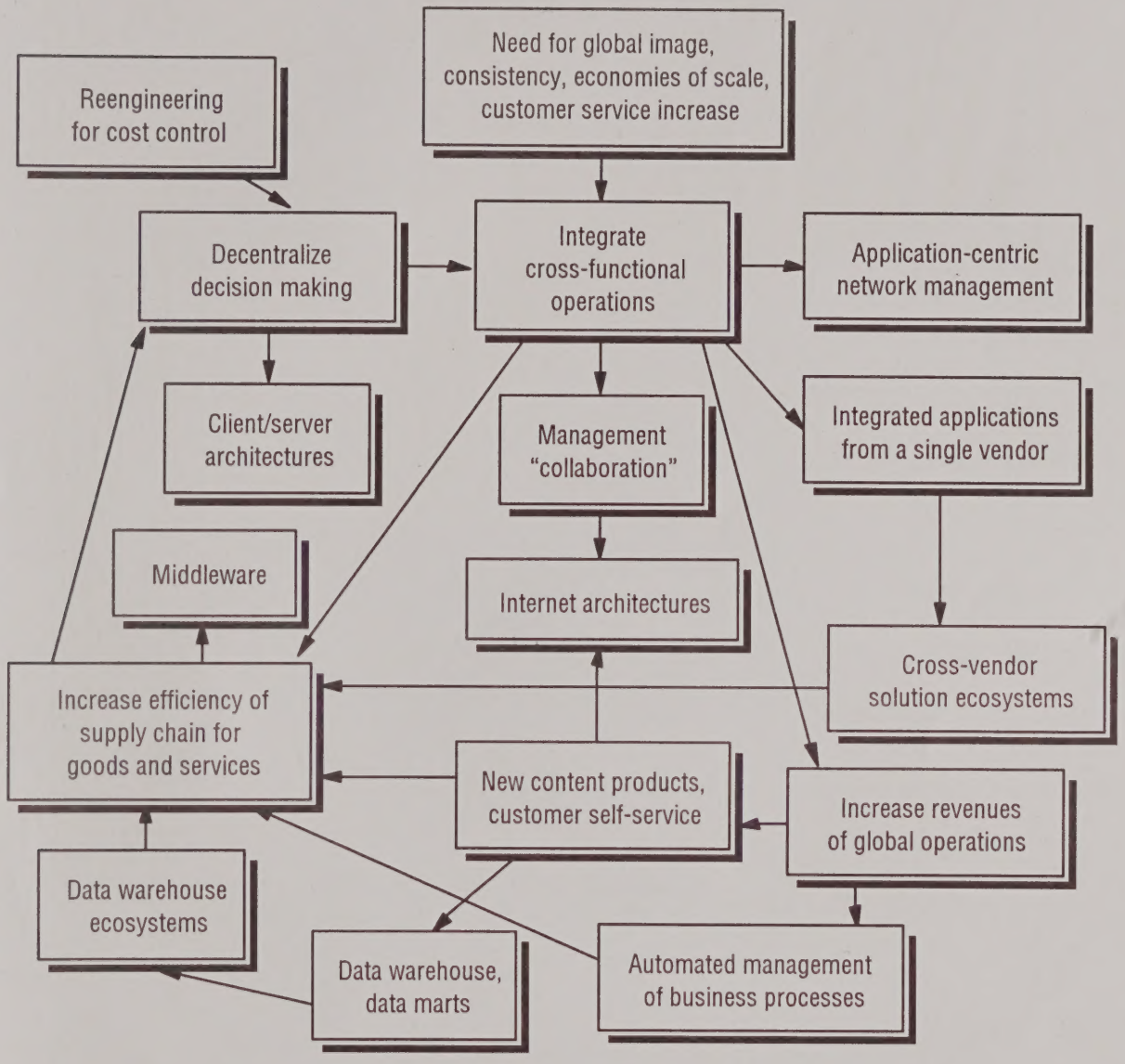
EFFICIENCY GAINS PROVIDE THE FIRST MOTIVE

Advances in information technology have enabled many companies to restructure their back-office and front-office processes. This restructuring has changed the way companies do business and has altered the competitive landscape in many industries. New IT solutions reduce the barriers to information for end users and aid in the support of new products and services — two functions indicated as most important in the decision to buy software by respondents in a recent IDC survey (*IDC Technology Integration Panel Study*, Winter 1997).

However, although corporate decision makers recognize that reducing barriers to information and supporting new product are clear benefits gained from software solutions, these responses belie the turmoil that companies are experiencing as they attempt to understand and take advantage of the multiple "waves" of cost-cutting reengineering, distributed computing, Internet and its "intra" and "extra" variants, and the current fad of revenue-enhancing customer intimacy. Figure 1 translates these exogenous business imperatives into operational initiatives that give a clue to the associated software investments. Figure 1 serves as the framework for the following discussion of business drivers. The causal flow of the argument can be followed via the arrows. An event at the tail of an arrow has a positive impact on the event at the head of the arrow.

Reengineering, motivated by cost control, has been and continues to be a motivator for client/server development and application purchases. Before client/server, the global enter-

FIGURE 1
SOFTWARE TREND FRAMEWORK OF MUTUALLY REINFORCING BUSINESS IMPERATIVES


Need for global image, consistency, economies of scale, customer service increase
Reengineering for cost control
Decentralize decision making
Integrate cross-functional operations
Application-centric network management
Client/server architectures
Management "collaboration"
Integrated applications from a single vendor
Middleware
Internet architectures
Cross-vendor solution ecosystems
Increase efficiency of supply chain for goods and services
New content products, customer self-service
Increase revenues of global operations
Data warehouse ecosystems
Data warehouse, data marts
Automated management of business processes

Source: International Data Corporation, 1997

prise often acted as a collection of loosely cooperating fiefdoms with replicated functions. Successful reengineering efforts have sped up decision making through empowerment of decentralized business units. Nonstrategic parts of the business have been outsourced.

Decentralization, however, has sometimes resulted in a loss of consistency and a potential loss of focus. The need to project a unified "global image," realize economies of scale, and focus on core competencies has led to the business imperative that mission-critical applications be integrated.

An ancillary effect of empowering employees and requiring cooperation across functions is that people, now more than ever, need an efficient, smart, controllable multimedia means of communicating with one another. Called "management collaboration," the business imperative here is to fully exploit the synchronous and asynchronous channels to get decisions made and information supplied. The Internet will play

an increasing role as communication requirements expand beyond the topologically homogeneous business unit.

Organizations are realizing the curse of traditional e-mail: laboring under the oppressive weight of random messages about everyone's business in the organization. Productivity is decreasing. The need for increased efficiency in group collaboration, along with the requirement that the implementation be cost effective and user driven, will result in a rethinking of the collaborative software market — pushing collaborative computing away from IS-centric solutions and toward intuitive products that will allow users to establish their own communication systems without relying heavily on IS. The trend, and real opportunity in the forecast period, will be toward tools that enable users to define their own groupware.

Forward-thinking CEOs are looking beyond the cost cutting embodied in the original precepts of reengineering and are focusing on increasing the revenue line.

The requirements for collaboration are too varied, ephemeral, and transcendental for traditionally built collaboration applications, except in the more predefined cases of messaging systems associated with specific vertical applications.

Software for Success, Not Just Survival

Meanwhile, a minority of CEOs — those that are forward thinking — are now focusing on the next business imperative. They are looking beyond the cost cutting embodied in the original precepts of reengineering and are focusing on increasing the revenue line. Success usually coincides with the revelation that the content of corporate transaction databases is of extremely high value for the following purposes:

- To search for new product ideas in the volumes of customer help desk problems, customer profiles, or customer usage patterns
- To create "markets of one" or highly personal products and services via customer self help or online product specification
- To market the content of the database itself, reorganized to appeal to users in related businesses
- To proactively manage business processes by combining application data stores with data about the physical operation of the network

Enter the data warehouse and the data mart, its slimmer, single-subject sister. Ultimately, the mining of data warehouses and marts will be responsible for turning many product development cycles around 180 degrees. Instead of designing a product, building it, identifying market segments, and packaging it, the reverse will happen. The product support database, the hotline, and a variety of external feeds will be mined for customer needs, and products will be conceptualized. Data warehouses will be queried to define precise packaging concepts.

On the horizon is the next business imperative: increasing the efficiency of the supply chain across company boundaries for both goods and service companies. Figure 1 shows that the federated enterprise may emerge at any time once the minimal requirement of a core group of distributed applications has been implemented. Success here will certainly rely on the Internet but will also include a realization that the diversity of federated applications among the user community requires the standardization of interfaces.

On the horizon is the next business imperative: increasing the efficiency of the supply chain across company boundaries for both goods and service companies.

Trends in Packaged Software Technology

Throughout the IT industry, not unique to software, the Internet continues to garner the hype of the media and technologists alike. The trend for Internet software is to move beyond home pages toward transaction applications in the areas of customer outreach, customer self help, and customer (and supplier) commerce. Although all areas of software will be impacted, the timing of Internet opportunity will be uneven. The impact of the Internet will gradually move from its home page-centric Web servers, firewalls, and authoring tools out to more powerful tools and a wider range of software needed

to manage increasingly complex transaction applications. Suppliers of operating environments have started to embed Web software as standard system services in their offerings. Client operating environments are beginning to include TCP/IP protocol stacks, Web browsers, and Java Virtual Machines. Server operating environments have already bundled TCP/IP protocol stacks. The next step is the inclusion of Web server software and a Java Virtual Machine.

The application development tools market has already begun to boil with the release of a variety of tools, from Web authoring to integrated development environments.

The trend for application vendors first will be to Internet enable their present functions, responding much as they did to the onset of client/server. This effort will be necessary to maintain customer bases in the short term, but, as Internet enablement becomes ubiquitous, it will not be sufficient to grow revenues in the longer term. Increased functionality — providing new capabilities by virtue of the Internet that were not possible even with client/server architectures — will provide additional revenues. Vendors like Microsoft, Netscape, and IBM will offer expanded sets of server suites, bringing "functional servers" to market as offerings that IT departments can script together to deliver distributed solutions at low cost and high certainty. However, these will come later, as vendors and users figure out the value-add of the new Internet topology and its content. Beyond electronic shopping, for example, we see relatively few functionally new applications now.

Another trend in the software industry is the unbundling of distributed applications. Client/server ushered in the era of the two-tiered application. Presentation services were relegated to the client platform while data management and all other services were relegated to the server. The trend will be to unbundle more and more of the remaining generic application services such as transaction, data, message, directory, and object, to name a few. Thus, the two-tier architecture will become three-, four-, five-, and six-tier architectures as more generic services are broken out of applications. These will start to appear as separate functional server software.

Because the constant parade of computing architectures shows no sign of abating, forward-thinking IS departments have begun to focus on coping strategies rather than fixating on a specific solution (or, even worse, a specific vendor).

Subsumed in the imperatives to run global businesses more efficiently is the imperative to run the IS function more cost effectively. Because the constant parade of computing architectures shows no sign of abating, forward-thinking IS departments have begun to focus on coping strategies rather than fixating on a specific solution (or, even worse, a specific vendor). The coping strategy must maximize flexibility while at the same time minimizing costs to change platforms, topologies, and application architectures. Furthermore, the coping strategy must accommodate all the business imperatives and be synchronous with the Internet and unbundling technology trends.

The strategy is to maximize reuse. The implementation of this strategy includes the mixing and matching of components from multiple vendors. This trend involves every market and will be a theme well into the next century. Components will thrive to the extent that users can mix and match components from a variety of tools, applications, system and network management, and middleware vendors. Application vendors are now beginning to break down their applications into components. Tool vendors are offering component assembly environments, and middleware vendors are offering a variety of industry-standard tools to facilitate messaging among components. Many more component enabling tools will be forthcoming, and with each the trend toward Internet-standard APIs will be enhanced.

NEW TRENDS IN CHANNELS AND PACKAGING

So far, strategies for long-term revenue growth in the software industry have been about owning the relevant APIs and thus locking in customer loyalty and future revenue streams. We expect a gradual erosion in the effectiveness of proprietary APIs because they are not in concert with any of the above business imperatives or industry trends. In

the future, we will see more ISVs using multivendor APIs for comparative advantage.

In the near term, a lack of defensible and deployable licensing models and metrics will result in a severe and merciless hammering of price levels in many markets, aided by the cost-shifting tactics of Microsoft.

The growing emphasis on and migration to desktop and midrange computing continues to undermine pricing and revenues associated with packaged software on mainframes and other large-scale systems. Windows NT-centric computing is effectively creating its own market space focusing on the department and workplace, thereby relegating Unix to the back room. The shift to NT and Internet means more systems and tools units sold, but this platform squeezes prices, especially as Microsoft competes in a wider range of markets.

Distribution channels will continue to diversify in the forecast period. One surprising impact of this diversification will be an increase in the rate of adoption of new technology.

Distribution channels will continue to diversify in the forecast period. One surprising impact of this diversification will be an increase in the rate of adoption of new technology. This will occur primarily because new technology is increasingly being bundled into digestible packages, even "disguised" by ecosystem leaders in the solution community. This occurs in the following forms:

- **Mergers and acquisitions.** An example is the agreement between Informix and Illustra. This will effectively hasten the adoption of Illustra's object database technology because it is being packaged in a brand-name database and served up through a large existing channel. Many small state-of-the-art companies will be supplying data blades for the Informix object-relational servers, thereby hitching a ride on the larger company's marketing machine.
- **Partnerships.** Novonyx was formed to port and market Netscape's SuiteSpot on Novell's IntranetWare servers. The combination of the new Netscape technology with the existing Novell channel and the tens of thousands of Novell-certified education and implementation partners will result in more new Netscape technology in the marketplace than if Netscape had to go it alone.

  Another example of a technology partnership is the Microsoft agreement with Rational in which Microsoft hopes to gain modeling technology for its assault on enterprise development shops. Recently announced is the merger of Oracle's Network Computer division with Netscape's Navio for the purpose of putting more muscle behind the development of consumer and light client solutions.
- **Reseller agreements.** Agreements that "encapsulate" new offerings, such as the agreement by SAP to resell Haht Software's Web development tool, I-Rad, add to distribution channel diversity.
- **Loyalty shifts.** While the system vendor was the preferred channel for IT purchases on minicomputers and proprietary systems, the move to commodity hardware and the Windows OS brings a shift in preference for ISV and VAR resellers. This translates to decreased margins for system vendors that lack aggressive VAR programs.
- **The "Microsoft channel" inexorably expands.** There is fierce competition in all markets between Microsoft and its competitors for the allegiance of solution partners. The most important battle will be over the software solution developers (small ISVs) and system integrators that Microsoft seeks to certify and elicit a pledge of allegiance to a Microsoft-only strategy. Microsoft has targeted certified Novell engineers and trainers for conversion into certified NT implementers. The small-company development community is next. Now looming is the battle over content providers, which Microsoft wishes to make Microsoft Internet Explorer- and Internet Information Server-compliant to the exclusion of competing content servers.

HOME COMPUTING

The low penetration rate of general-purpose home computers in the United States (40%),

and the even lower penetrations in other countries, is attributable, beyond simply cost, to the fact that home computers still embody a "computing" metaphor. This is singularly unappealing to users not primarily motivated by the notion of "computing" but who instead are looking to learn, be entertained, or perform any number of household functions. The popularity of dedicated game machines (at price points well below those of the general-purpose computer) proves this point. We expect breakthroughs from the likes of Navio and/or the entertainment industry to finally crack the consumer multipurpose computer market.

Packaged Software Market Forecast: Worldwide View

The worldwide packaged software market grew 13.8% in 1996 to reach $105 billion. Although this is solid growth, it is significantly lower than the 17.0% growth enjoyed in 1995. Desktop dynamics (such as the inability to match 1995's success of Windows 95/NT operating systems revenues and 1996's demise of 16-bit operating environments) and unilateral downward pricing pressures (across markets and platforms) are the primary factors behind the adjustment this year. The maturity of general-purpose client/server tools and applications is also resulting in moderated growth across many markets.

The four top-ranked vendors, IBM, Microsoft, Computer Associates, and Oracle, maintained their leadership positions in the worldwide software market. IBM continues to dominate the market with 12.3% share. IBM's overall software revenue grew only 3% to $13 billion in 1996. IBM experienced healthy growth in applications solutions and application development tools while systems infrastructure software revenues are virtually stalled as IBM prepares for the Internet/Java era. Microsoft's revenues rose 19.0% to exceed $9 billion, compared with $7.2 billion in 1995. Computer Associates held on to third place with 3.6% of worldwide market share. Fourth-ranked Oracle, with the most aggressive growth in the top 10, increased revenues 36.6% to $3.6 billion.

Hewlett-Packard and SAP moved into 5th and 6th, respectively, as Novell slid to 7th. Novell's software revenues declined 33% to 1.2 billion, compared with 1995 revenues of $1.9 billion. The remainder of the top 10 includes Hitachi, with outstanding growth of 44%, Informix, and Sybase (ranking 8, 9, and 10, respectively). Together, the top-10 vendors constitute 35.4% share of the worldwide market.

In the overall packaged software market, the United States represents the lion's share, with 45% in 1996. It extends this share through the forecast period to 47% in 2001. Asia/Pacific grows its share 1.5% to 14.3% in 2001 (see Table 1).

Table 1
Worldwide Top-10 Software Vendors, 1996

1996 Rank		1996 ($M)	1995–1996 Growth (%)	1996 Share (%)
1	IBM	13,037	3.10	12.38
2	Microsoft	9,033	23.97	8.58
3	Computer Associates Intl.	3,746	6.68	3.56
4	Oracle	3,627	36.33	3.44
5	Hewlett-Packard	2,001	9.73	1.90
6	SAP AG	1,748	29.45	1.66
7	Novell	1,239	-33.66	1.18
8	Hitachi	1,112	42.79	1.06
9	Informix	914	31.71	0.87
10	Sybase	861	10.08	0.82

Source: International Data Corporation, 1997

Western Europe loses share during the forecast period, although it remains the second-largest market by far. Western Europe's growth rate of 13% lags the worldwide average growth by a point and causes this region to slip from 33.5% share in 1996 to 31.7% share in 2001.

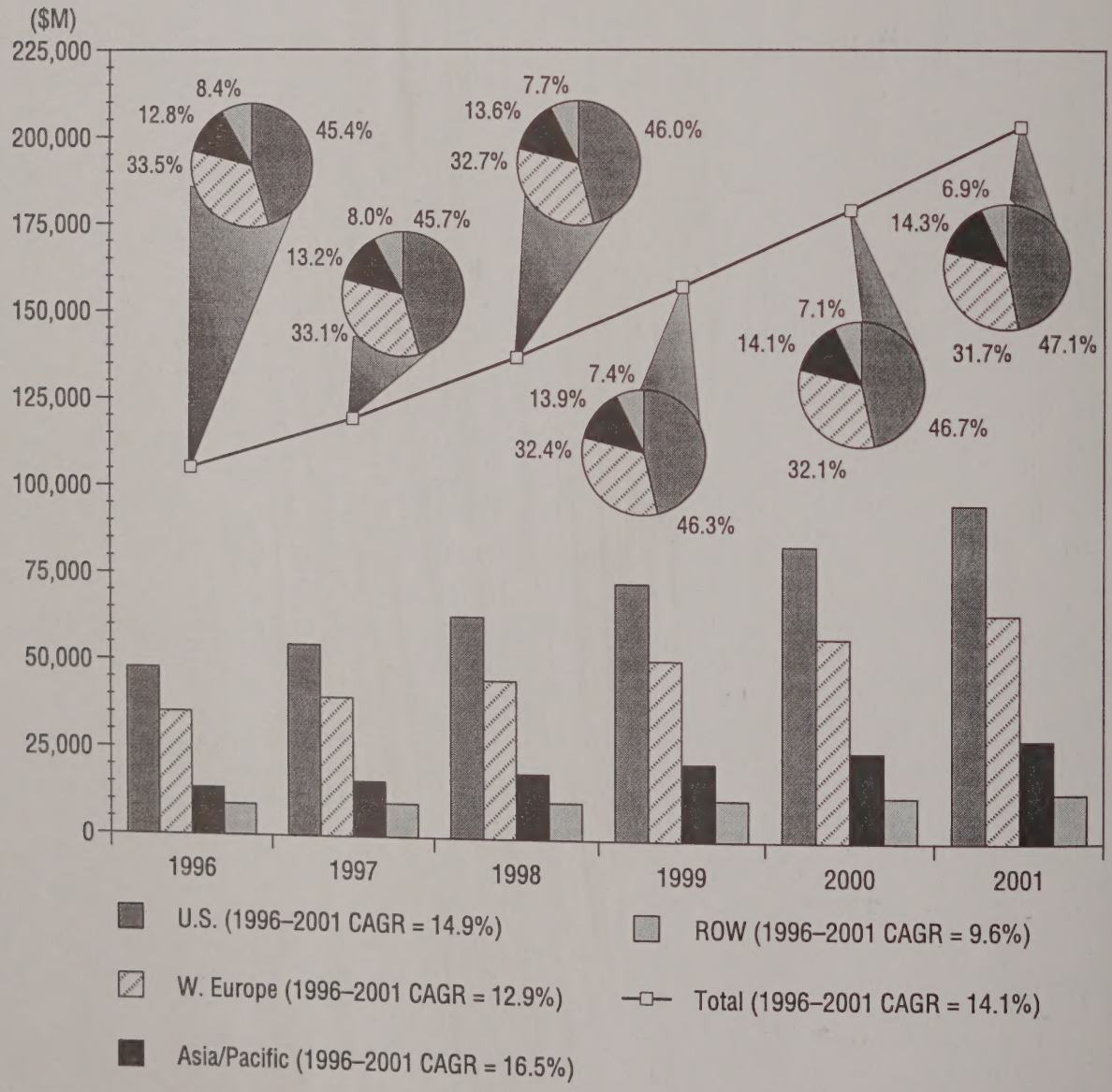
Asia/Pacific and the United States have the fastest growth rates, 16.5% and 14.9%, respectively, but neither of these surpass the worldwide average by a significant margin (see Figure 2).

The individual packaged software market segments are quite varied, and in some cases the market dynamics differ completely from one market to the next. Although IDC tracks the packaged software market as a whole, which establishes its relationship with other segments of the overall IT market, we break the overall packaged software market into several tiers of market segments for a more granular view. Table 2 illustrates IDC's taxonomy of the packaged software market.

All three primary software markets experienced healthy growth in 1996. As in 1995,

FIGURE 2

WORLDWIDE PACKAGED SOFTWARE REVENUE FORECAST BY GEOGRAPHIC REGION, 1996–2001



Source: International Data Corporation, 1997

TABLE 2
PACKAGED SOFTWARE FUNCTIONAL TAXONOMY

Primary Markets	Application Solutions			Application Development Tools		System Infrastructure Software			
Secondary Markets	Consumer Applications	Cross-Industry Applications	Vertical-Industry Applications	Information Access Tools	Programmer Development Tools	System Management Software	Middleware	Serverware	System-Level Software
Markets	Home education/ edutainment Games and entertainment Home productivity	Accounting Human resource management Distribution Project management Maintenance management Sales force automation (SFA) Customer support and help desk Office applications Word processing Other office applications Other cross-industry applications	Banking/finance Insurance Health care Manufacturing Process manufacturing Discrete manufacturing Mechanical CAD EDA Other vertical applications	Spreadsheets Multidimensional analysis tools Executive information systems (EIS) End-user query and reporting tools Statistics and technical data analysis tools Data mining Spatial data management End-user DBMSs Other information access tools	DBMS engines Object DBMS Analysis, modeling, and design (AMD) Object-oriented analysis, modeling, design, and construction 3GLs Object-oriented programming 4GLs/RAD Component construction and assembly Software components Web professional development tools Automated software quality (ASQ) Software configuration management (SCM) Other programmer development tools and utilities	Management platforms Event automation Job scheduling Output management Storage management Performance management Change and configuration management Security management Problem management Database administration tools and utilities	Desktop access middleware Data access middleware (DAM) Remote procedure call middleware (RPC) Message-oriented middleware (MOM) Distributed transaction processing middleware Object middleware	Serverware	Operating systems and subsystems Networking software and services System utilities

Source: International Data Corporation, 1997

system infrastructure software exhibited the most robust growth — led by Microsoft, which grew 43%. By 2001, IDC expects both applications and application development tools to outpace system infrastructure in revenue and growth rates (see Figure 3).

Packaged Software Forecast by Primary Market

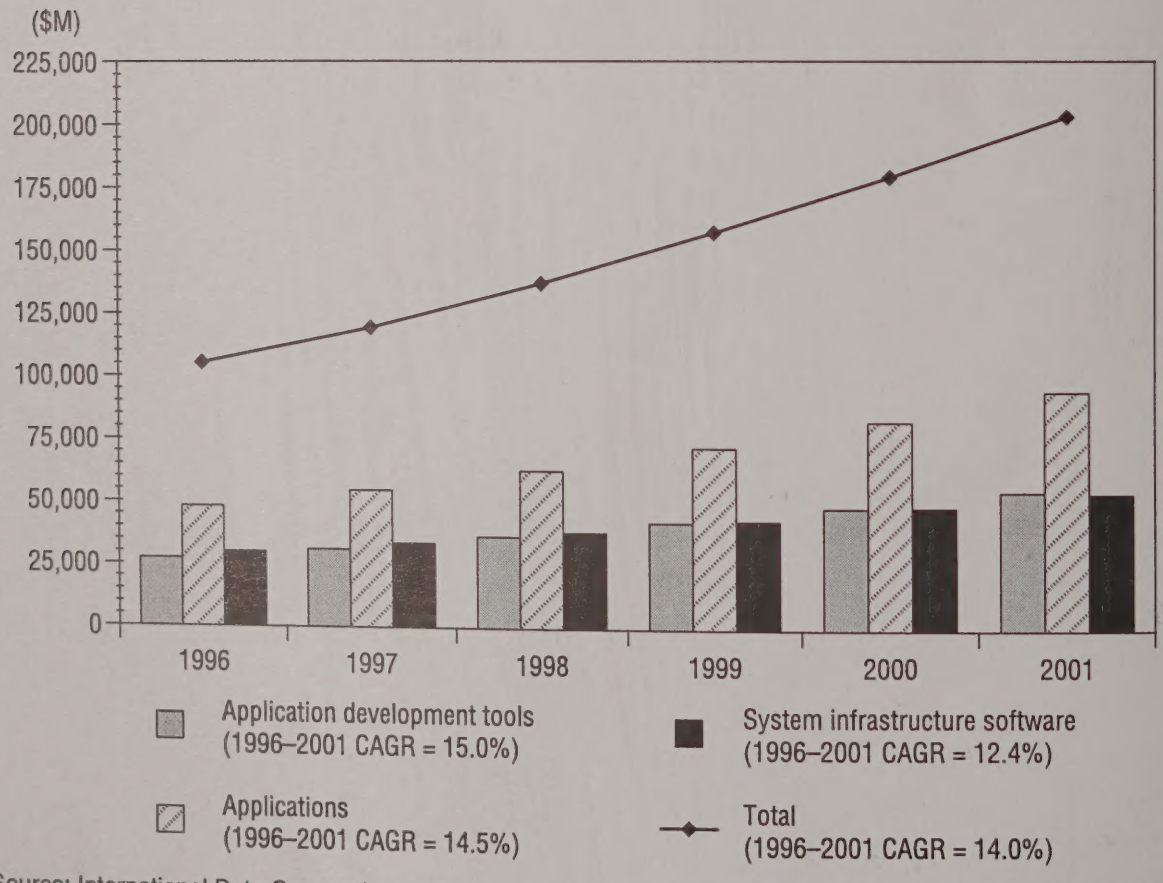
IDC divides the packaged software market into three primary markets: application solutions, application development tools, and system infrastructure software.

Application solutions include consumer, commercial, and technical programs designed to solve specific problems or perform specific tasks in the home or corporate environment. Business solutions can be cross industry, meaning they can be used in more than one type of industry and serve the same purpose (such as accounting software, sales force automation software, etc.) or they can be vertical industry or industry specific, meaning they solve problems unique to a particular industry (such as banking and finance software, health care software, etc.).

Application development tools are composed of information access tools and programmer development tools. Information access tools are end user oriented and not usually used by professional programmers (these tools include spreadsheets, executive information systems, etc.). Programmer development tools support professional developers in the design, development, and implementation of a variety of software systems and solutions. (Examples include object-oriented analysis, modeling, design, and construction tools, 3GLs and 4GLs, and DBMS engines.)

Figure 3

Worldwide Packaged Software Revenue Forecast by Primary Market, 1996–2001



Source: International Data Corporation, 1997

System infrastructure software comprises system management software, middleware, serverware, and system-level software. Collectively, these types of software provide the layers on which communications and business applications operate and, in the case of system-level software, the interface for users to control hardware and network functions.

Events occurring within either the application solutions, application development tools, or system infrastructure markets may have sweeping effects on the aggregate packaged software industry (e.g., the current struggle between NT and Unix influences which market solutions vendors and tool developers are making product for). However, certain market dynamics may be unique to their respective primary market. For this reason, IDC segments its worldwide software forecast by primary market.

Applications Solutions Forecast

Worldwide application markets showed vendor revenues of $48.0 billion in 1996, representing a growth rate of 12.7% over 1995. In 1997, the market will be $54.7 billion. This primary market is expected to grow to $94.5 billion by 2001, which translates to a CAGR of 14.5% for the period 1996–2001.

The United States continued to represent the largest market for applications, growing its market share in 1996 by slightly over one point to 46.2% of the worldwide market. Europe resumed its downward trend from previous years by losing 1.5% share of the market in 1996; Asia/Pacific and ROW combined to recapture the 0.5% share lost during 1995.

The influence of the Internet in application sales was only beginning to be felt in 1996, as the first Internet-enabled application software hit the market. The impact will become more pronounced from 1997 on. The rise of the accompanying server-centric application architectures will make the platform battles on the server end worthy of attention (see Figure 4).

Key drivers for this growth include the following:

Reengineering of business processes that span departmental functions will persist as a key market driver over the long term. Reengineering initiatives also are being extended to the business network.

To thrive in this competitive landscape, many vendors are stepping up to deliver Internet-deployable client/server solutions, which should translate into business return. On the downside, however, these new Web products will create a new challenge for client/server software suppliers, because they will require a fundamental rebuilding of their applications architecture. IDC expects Web applications to exceed $6 billion in 2001, with the greatest opportunity in collaborative and supply-chain-related segments.

Analytic applications will be strong as organizations seek better ways of controlling expenses and new business opportunities. The scope of reengineering efforts could be expanded to support the business need of ongoing optimization, improvement, and performance measurement.

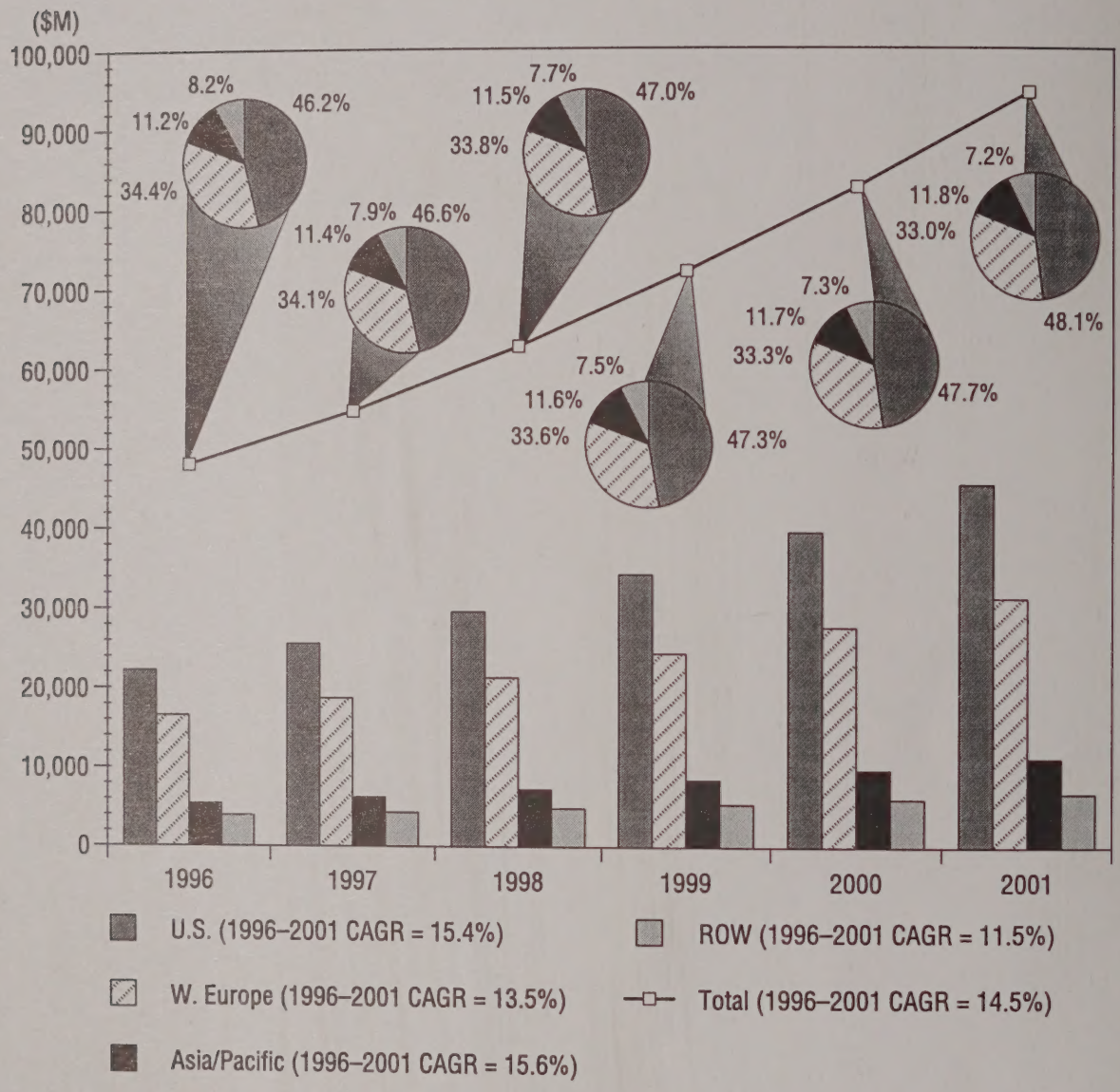
The year 2000 issue will be an additional boon to application sales in the first two years of the period. After that, other mandated change initiatives such as the Euro currency will impact the market in specific geographies.

The consumer software market was at $4.7 billion in 1996 and will grow at a 15.7% CAGR over the period. Although home PC penetration remains relatively low at approximately 40%, the consumer software market is experiencing symptoms generally associated with more mature markets. Specifically in evidence are consolidation among vendors, pricing pressure, slower unit sales, and higher demands for product differentiation.

Even with the tendency of organizations to want to secure all their enterprise applications from one source, there is a continuing demand for best-of-class products. Research in IDC's *1997 Corporate Computing Vertical Views: Technology Integration Matrix Panel* indicates that enterprise suites are more in demand among smaller companies, primarily manufacturers, and best-of-class software is more in demand by larger enterprises, primarily service providers. However, this finding is directional only; the movement to enterprise suites is affecting health care almost as much as manufacturing. In the final

FIGURE 4

WORLDWIDE APPLICATIONS SOLUTION MARKET BY REGION, 1996–2001



Source: International Data Corporation, 1997

analysis, the long-term axiom that the business case determines the application choice still applies.

IDC projects continued strong demand for application servers, with NT server revenue growing to $10.6 billion by 2001, a compound annual growth rate of 44.6%. The influence of the Web driving a more server-centric application architecture should provide growth for other server platforms as well, but at somewhat less robust rates. Multiuser Unix should grow at 21.3% compounded annually over the five-year period, and OS/400 will grow at 15%.

SYSTEM INFRASTRUCTURE SOFTWARE

IDC estimates that worldwide system infrastructure software markets created vendor revenues of $26.2 billion in 1995 and grew to $30.1 billion in 1996, a growth rate of 12.9%. Worldwide system infrastructure software markets are expected to

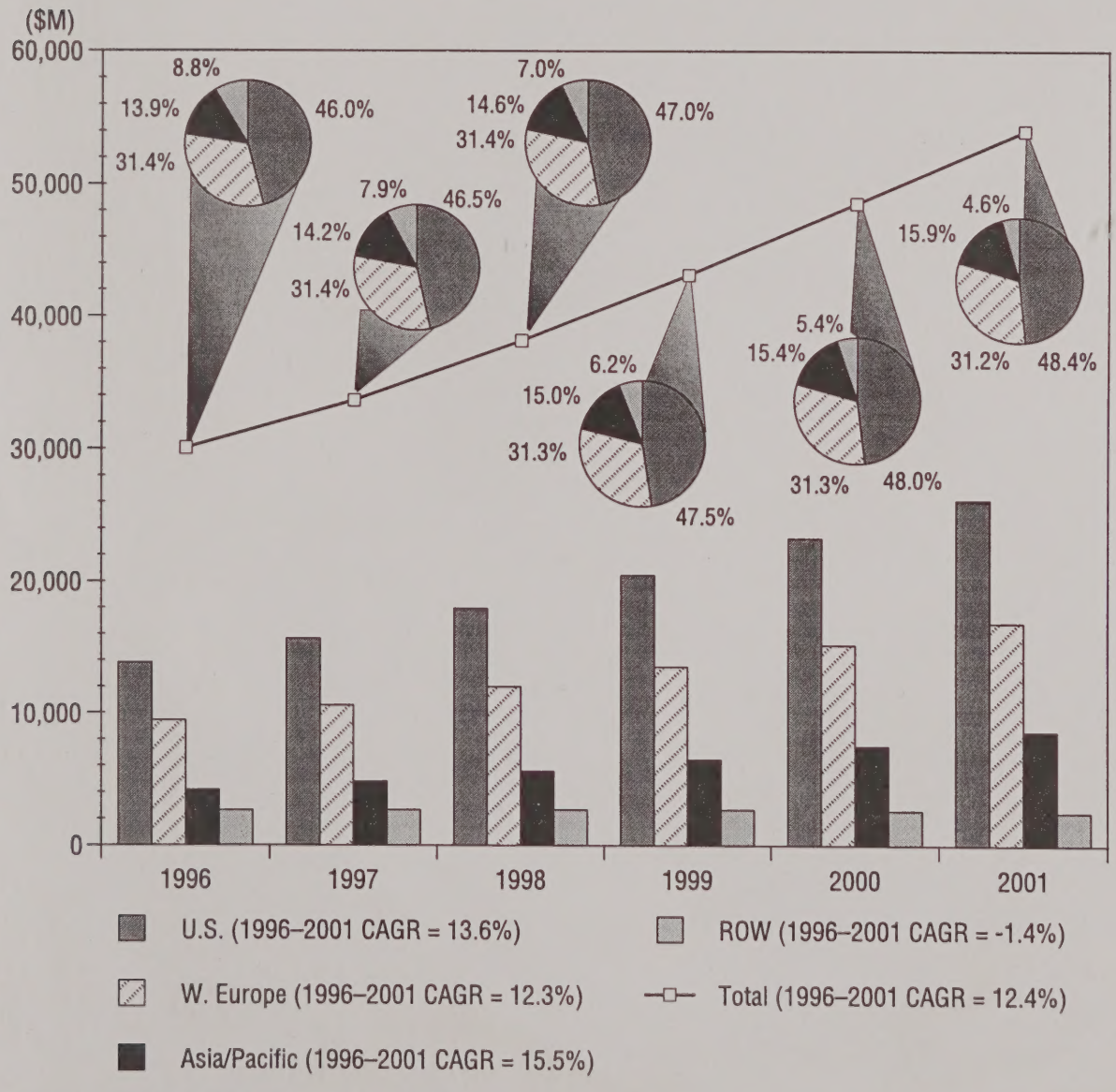
grow to $33.6 billion by 1997 and to reach $54 billion by 2001. The average growth rate for the rest of the decade is still expected to be slightly under 13% (see Figure 5).

Continued strong growth in operating systems for PC-based desktops and small servers will propel demand for shrink-wrapped system software solutions such as Windows NT, Windows 95, and its successor, Windows 98 (formerly "Memphis"). The growth of Internet/intranet servers and fast-evolving functional servers and server suites will also create a steady demand for these server platforms.

The operating systems battle has become a battle of shrink-wrapped solutions — even IBM is repackaging its mainframe MVS operating system as OS/390 and positioning it as such. IDC expects this trend to continue with operating systems becoming packages of components chosen on the basis of their "fit" with the specific requirements of the application(s) supported. The growth of these component-based server pack-

FIGURE 5

WORLDWIDE SYSTEM INFRASTRUCTURE SOFTWARE MARKET BY REGION, 1996–2001



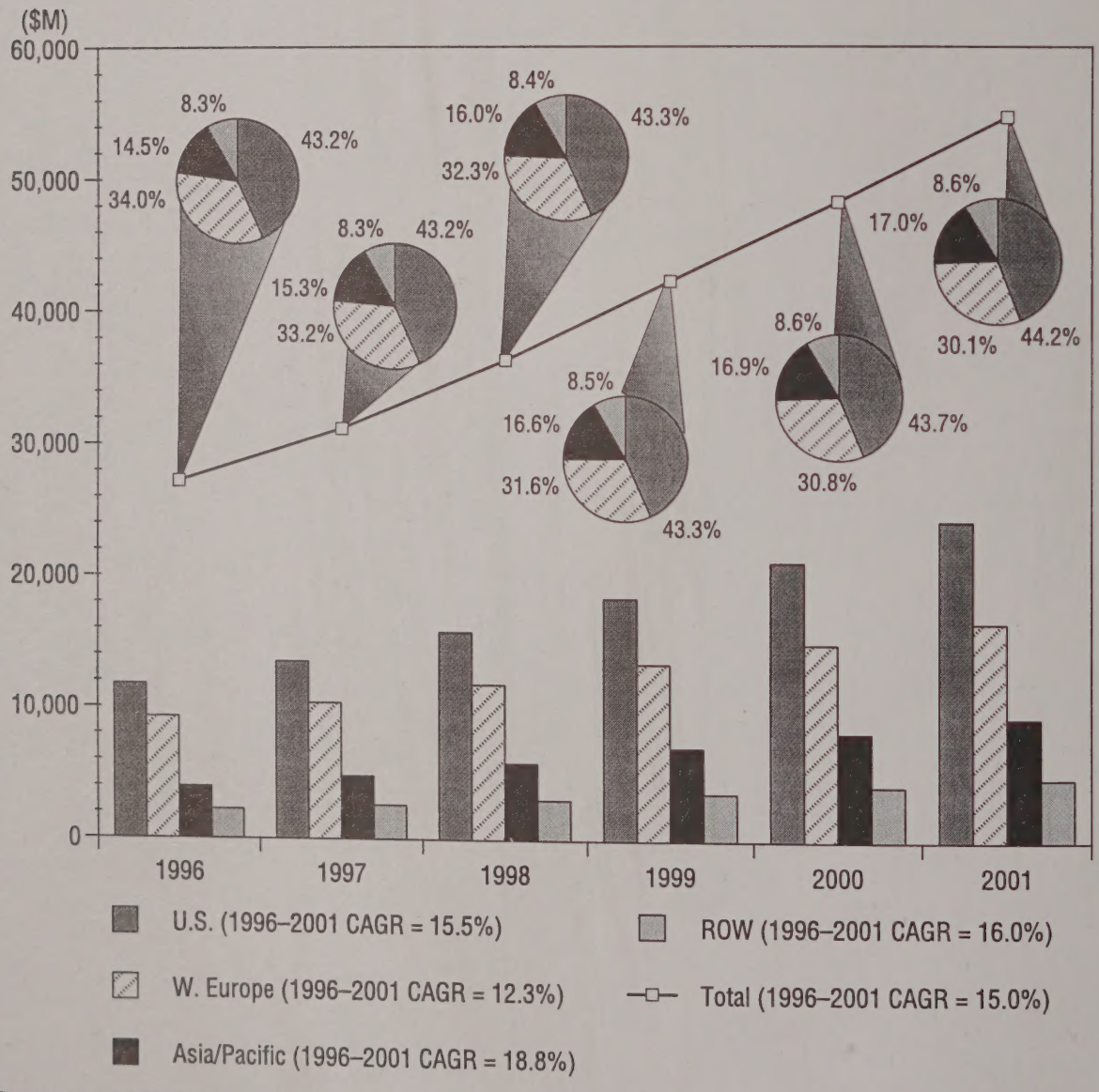
Source: International Data Corporation, 1997

ages will reduce emphasis on "operating system wars" and will cause customers to choose a given OS on the basis of which one best fits the need. This trend will be made easier by the widespread availability of system management solutions that are truly cross platform as well as by the convergence of standards toward a common set of de facto standards. Furthermore, the Java Virtual Machine is becoming a standard system service in most major operating environments. As Java-based applications become prominent, the operating environment selected for a given task becomes less important.

With the exception of dedicated mainframe tools, system management solutions are now typically distributed or client/server applications architected with agents that run on

FIGURE 6

WORLDWIDE APPLICATION DEVELOPMENT TOOLS MARKET BY REGION, 1996–2001



Source: International Data Corporation, 1997

the managed systems, which "talk" to distributed management applications that run on "outboard" management platforms. This is even becoming true for some mainframe system management tools, as the integration of those environments with the client/server environments for system management purposes continues. IDC has also seen many system management solutions suppliers adopting a Web browser, Java, and HTML as the distributed user interface.

The continuing adoption of client/server architectures by the corporate mainstream results in complex hardware configurations supporting increasingly mission-critical applications. The software required to connect the systems — which IDC refers to as "serverware" — and the software connecting the applications, true middleware, are therefore both increasing in demand.

The advent of Web-based applications that are — at the very least — "mission significant," is leading to a need for solutions that increase the robustness and scalability of what currently are patchworks of applications and servers. IDC believes that enterprise serverware and middleware to serve this emerging market will drive considerable activity in the coming years.

Application Development Tools

The worldwide application development tools market was $27 billion in 1996 and will double by 2001. Year-on-year growth is 15%, which is slightly faster than the other primary markets, but not by a distinguishing factor (see Figure 6).

The top 10 vendors worldwide in 1996 were IBM, Oracle, Microsoft, Computer Associates, Informix, Sybase, SAS, Compuware, Hewlett-Packard, and NEC. Oracle, Informix, Microsoft, and SAS all moved up in the ranking since last year.

All numbers presented in this document may not be exact due to rounding.

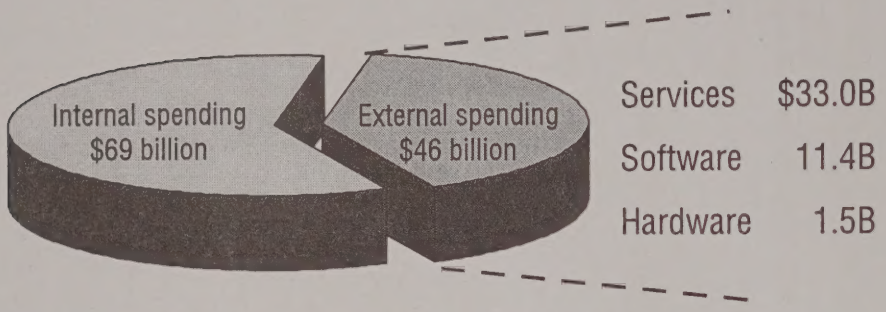
The Year 2000 Effect

One industry event certain to have both a positive and negative impact on the worldwide software market is the Year 2000 date problem. In the United States, the Year 2000 problem will cost $115 billion in corporate expenditures, based on internal resource costs and external hardware, software, and services that companies must purchase to address the issue.

As shown in Figure 7, the Year 2000 problem will generate $11 billion in software revenue before the magic date. However, perhaps more notable is the $69 billion in internal spending and $33 billion in external services spending that may affect corporate purchase plans for new software.

In its 1996 Y2K Survey of Executives, IDC found that 63% of respondents expected the date problem to have severe or moderate impact on their spending patterns. Simply put, the $11 billion in new software revenues generated by Year 2000 may be eclipsed by the reallocation of resources that would have been spent on different, non-Year-2000-related purchases (see Figure 8).

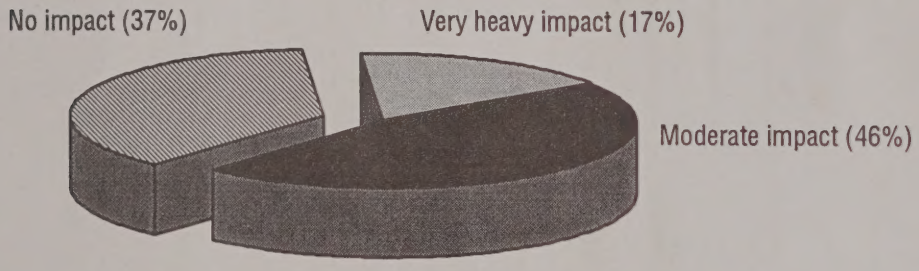
Figure 7
Planned Spending on Y2K Project in U.S.



Total $115 Billion 1995–2000

Source: International Data Corporation, 1997

Figure 8
The Y2K Project — A Drain on Other Technology Initiatives



Impact on Spending Patterns - ca. 30%

N = 275
Source: International Data Corporation, 1997

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Computer Industry Report

THE GRAY SHEET

Global market intelligence on the information technology industry since 1964.

MCI Provides New Meaning to the Phrase "Get Some Backbone"

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October 15, 1997

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Doubters of the Internet's strategic importance — for the IT industry and for *all* industries going forward — need only look at the continuing saga of the courtship of MCI to experience a change of heart. The number-two long distance company is collecting suitors like Odysseus's Penelope partly because its dowry includes a large portion of the Internet backbone.

WorldCom splashed its name in newsprint at the beginning of October when it announced a $30 billion stock offer to purchase MCI right from under the nose of British Telecom, which had made a bid to merge with MCI late in 1996 and has been struggling with the details (i.e., the financials) of the planned amalgamation ever since.

WorldCom's bold move put forth a wake-up call to the entire telecommunications industry because the aggressive youngster in the arena of long distance service could become a "one-stop shop" for local, long distance, and Internet services if it can successfully integrate MCI's various product offerings. Even more alarmed than the major telcos were the independent Internet service providers (ISPs), which have been in a tizzy since UUNET (a WorldCom subsidiary through acquisition) began charging line fees for data traffic earlier this year.

However, small ISPs and large long distance giants weren't the only entities to see (and fear) the value of a potential MCI/WorldCom union. GTE, often called the bastard son of the local calling industry, countered WorldCom's offer with $28 million ... in cash.

Numerous questions arise in the face of such high business drama:

- Will either WorldCom or GTE be allowed to succeed with their quest, or will the regulatory hand of the U.S. government quell such ambitions for the sake of antitrust laws?
- Will British Telecom sit idly and let a prime opportunity to profit from the U.S. telecommunications market slip away?
- Is MCI really worth the price GTE and WorldCom are willing to pay, considering the losses it has incurred while establishing local phone service operations?

IDC International Data Corporation ■ 5 Speen Street, Framingham, MA 01701 ■ (508) 872-8200

THE GRAY SHEET
Associate Editor
Rick Miller

Production
IDC Publishing Services & Technologies

Editorial Advisers
Donald C. Bellomy, Doug McLeod
Lloyd Cohen, John Gantz
David Vellante, Gigi Wang
Bruce Stephen, Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573, Oxon Hill, MD 20750-0573

■

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- How will any of the planned mergers affect the billions and billions of bits of data transported through the U.S. Internet backbone, parts of which are owned by the various players in the pending deals?

This issue of *The Gray Sheet* briefly examines the dynamics of the various deals involving MCI and examines in graphical detail the effects various scenarios could have on the Internet backbone.

BRITISH TELECOM: A GOOD IDEA AT THE TIME

When British Telecom and MCI announced their intent to merge almost one year ago, IDC labeled it "a bellwether for the future of the telecommunications industry," and with good reason. The proposed merger would have established a global megacarrier capable of bundling local, national, and international telecom service.

British Telecom represented the staid, large, utility-company type of telecom provider: a former monopoly that streamlined itself to remain competitive without losing its vast presence. MCI was the up-and-comer: the aggressive, lean, "new" type of telecom provider that succeeded against another former monopoly (AT&T) through creativity and savvy marketing.

The merged entity was to be called Concert, following up on an agreement between MCI and British Telecom in 1993 that established Concert Management Services. Concert Management Services was chartered with developing a consistent global network resource from a technical perspective as well as product development and marketing perspectives. Concert Management's services, including both shared data and VPN voice offerings, targeted primarily multinational organizations.

The new Concert resulting from the planned acquisition would share the same name and distribution strategy as the first Concert (which will remain Concert Management Services) but would reflect the complete integration of the two companies. MCI and BT (and existing partners) would remain branded distributors in their respective parts of the world, but Concert would drive a consistent set of products and development strategies that were not possible with the old structure.

For example, British Telecom and MCI developed distinct Internet strategies, which would be rationalized under the Concert umbrella. Another area of divergent positioning is network integration. British Telecom has maintained a distinct organization, Syntegra, and MCI purchased SHL Systemhouse, now called MCI Systemhouse. The new Concert planned to combine these two organizations. On the other end of the spectrum, British Telecom also identified multimedia services as a particularly important opportunity for Concert's future. For this service, Concert would have the opportunity to develop a single, coherent strategy from the outset without having to reengineer two products.

As Concert, MCI and BT would roll out a single, consistent portfolio of local, long distance, and international services, including voice, data, wireless, Internet and intranet, information technologies, and outsourcing.

As hindsight has shown, however, all was not well in paradise. At the outset of the announcement of

British Telecom's pending deal, IDC published the following:

"Absorbing MCI may not be an easy transition for British Telecom. Some future issues for this company include both cultural as well as strategic visions. IDC believes that any successful global relationship requires strong equity investment between involved parties. Even with the already established relationship, it took more than a year for MCI and British Telecom employees to work well together and for Concert to operate as a functional group. Given this history, IDC expects that wholesale combination of these disparate business cultures will be a major challenge."

Fortunately or unfortunately for British Telecom, the cultural differences have not yet presented themselves in the form of working-relationship disconnects; they've appeared in the form of disgruntled shareholders fickle over the worth of their potential purchase. Investor pressure caused British Telecom to reduce its bid for MCI from $21 billion to $18–19 billion as the losses from MCI's initial forays into local phone service began to accumulate.

British Telecom's balk caused the rest of the U.S. telecommunications industry to eye the batter's box, with WorldCom stepping up to take the first swing. Now British Telecom is in a pickle; it can't rightfully offer a counter proposal significant enough to match the $40 billion equivalent of WorldCom because British investors would be outraged. Yet without MCI, British Telecom loses its chance to enter the lucrative U.S. telecommunications market and misses out on MCI's aggressive marketing schemes and technology offerings such as wireless services, systems integration powerhouse Systemhouse, and Internet services.

At this point perhaps the only thing British Telecom can salvage from MCI is what it had to begin with — a 20% stake in whatever the upstart long distance becomes.

WHAT IN THE WORLDCOM IS THIS?

When WorldCom made its bid for MCI at the beginning of October, the implications of such a merger were so hard to digest the entire U.S. trade press seemed to hiccup. With such a move, bit-player WorldCom is now demanding entree status on the menu of world-class telecommunications and data communications providers, riding a wave of successful minor yet strategic takeovers and the blessing of Wall Street all the way.

On October 1, WorldCom made a public offer to acquire MCI for approximately $30 billion in stock, which is more than $10 billion greater than the existing offer from British Telecom. Through improved operations and eliminated redundancies, WorldCom believes that the combined entity could reduce costs by $2.5 billion in 1999 and by $5 billion in 2002, a savings of upward of $13 billion in the four years following the merger. In contrast, the British Telecom-MCI merger was estimated to gain integration synergy benefits worth $2.7 billion during the five years following their merger.

The British Telecom-MCI merger would increase British Telecom's annual revenue by about 80%, but earnings would decline. The proposed WorldCom-MCI merger would increase WorldCom revenues by some 270% and would boost WorldCom earnings by 22% in the first year after closing.

Under the terms of the merger proposed by WorldCom, each share of MCI stock will be converted into approximately 1.2 shares of WorldCom common stock. The is the same strategy applied in the MFS merger completed in December 1996 in which MFS shareholders received 2.1 shares of WorldCom stock for each share of MFS.

WorldCom's acquisitions have been financed without a "red dime of debt," to quote WorldCom CEO Bernie Ebbers. Until last week — taking advantage of a booming bull stock market — WorldCom acquired new companies by issuing more shares of stock, yet not diluting the value of any shares.

WHAT'S IN IT FOR WORLDCOM?

The MCI merger would yield important network-related assets — almost tripling the number of switches in the U.S. market, more than doubling WorldCom's long distance footprint in United States, and accelerating WorldCom's network expansion efforts by two years. Furthermore, MCI's Internet backbone is an important piece for WorldCom. Although, by WorldCom CEO Ebbers's admission, the MCI network is less important than MCI's systems integration, network integration, and service bundling capabilities.

A very powerful weapon in the MCI arsenal for cracking the market for multinational corporations is Systemhouse, a world-class system integrator. No other telecommunications operator in the world can lay claim to an in-house system integration unit. Sprint's very recent acquisition of Paranet comes closest, with AT&T Solutions a very distant competitor.

WHAT WILL BECOME OF SOCIETY?

The big question from the possible WorldCom/MCI merger is what effect will the combination have on the Internet, the backbone of the burgeoning information society?

Through its earlier acquisitions of ANS, CompuServe Network Services, and UUNET, WorldCom is gaining control of a large portion of the lines that compose the U.S. Internet backbone (see maps at the end of this newsletter).

With MCI, WorldCom would gain control over an *even larger* portion of the backbone. IDC estimates that WorldCom would control about 50% of the wholesale network services market. Internet watchers raise the dreaded question: Will WorldCom eliminate peering and start charging for data transmissions?

The short answer: No.

Although UUNET and ANS provide vast geographic coverage and traffic volume — and MCI only will compound these statistics — large corporate clients and ISPs still have too many other choices when it comes to Internet connectivity.

From the moment WorldCom announced its wooing of MCI, the financial press questioned the U.S. government's willingness to allow such a combination, citing a potential restriction of trade in the Internet service arena. This restriction appears to be more fear than fact.

WorldCom competitors are quick to point out that extensive coverage does not an effective backbone make. ISPs handling large numbers of users, or even not-so-large numbers of users but ones with extensive bandwidth requirements, will seek partnerships with backbone providers that have reliable, technologically advanced pipes. Geographic gaps can be filled with selective partnering; technological advances must be researched, developed, and/or purchased. And this dynamic is even more pertinent to large corporate clients that place higher value on reliability.

A spokesman from PSINet makes the point that hyped consolidations in the Internet services industry sometimes only fuel demand for the players not involved. ISPs and large corporations with suspicions about WorldCom's ability to start charging may eliminate WorldCom from the selection pool. With network services growing at 40% per year through 2000, PSINet and other providers see enough market to go around without charging their peers for data transmission.

What consolidation in the Internet service industry may signify, however, is increased requirements for ISPs to be eligible for peering agreements. As a single player like WorldCom expands its proprietary network, the value-add it gets from minor ISPs is further reduced. Without leverage, smaller ISPs will pay.

WILL WORLDCOM FIND A BOTTOM LINE?

Whether WorldCom improves its bottom line and reaches telecom stardom remains to be seen. The assets it can pick up from MCI appear to be very complementary, but one thing must happen before the plan can succeed: MCI must accept WorldCom's offer.

For MCI shareholders, the offer should be more attractive than that of British Telecom. However, the new cash deal proposed by GTE may involve much less speculation than the all-stock deal offered by WorldCom. The drastic swings in the market, and WorldCom's dipping stock price, present an obstacle.

GTE JOINS THE FRAY

While much of the telecommunications industry grumbled and gasped at WorldCom's proposal to buy MCI, one phone industry player reacted in kind — perhaps because it's the only one that can.

Precisely two weeks after the WorldCom announcement, GTE made its all-cash offer of $28 billion for MCI. At the onset, this news seemed almost as dramatic as WorldCom's announcement — not because of the size, but because the mere proposal lent credence the belief that MCI truly was worth more than British Telecom had concluded.

On further review, GTE's alternative to WorldCom's bid makes a lot of sense because many of the other players in the telecommunications industry couldn't counter WorldCom even if they wanted. Per the 1996 Telecommunications Act, the regional Bell operating companies (RBOCs) can't buy MCI because they're prohibited from entering the long distance arena until they open their local markets to competition. Several have tried long distance endeavors, but have been unequivocally shot down by the federal government. AT&T can't make a bid for MCI because when the leading player in an industry (in this case, long distance service) tries to buy its closest competitor, it always leads to regulatory problems.

The only telecom company with a clean shot and the financial resources to execute is GTE. The local carrier/Internet player is not prohibited from entering the long distance services business be-

cause it was never owned by the Ma Bell monopoly and thus is exempt from the regulations the RBOCs must endure.

Gee, It's Gonna Cost Some

The one drawback to a cash deal is that GTE must come up with the cash. GTE claims to have found financing for the deal and hinted that noncore assets of both companies would be sold to help reduce the mountain of debt created by the purchase.

How will GTE's near-term benefits compare with WorldCom's if it wins MCI?

GTE claims it will save $1.5 billion in 1999 and up to $2.4 billion in 2000 if it combines its operations with MCI. The anticipated synergies between the companies appear reasonable. GTE can help MCI's struggling ventures in local phone service, but because the two companies do not overlap their offerings in geography, redundancy is limited.

In 1996, GTE's revenue was $21 billion; MCI's was $19 billion. Combined, the revenue from these companies would be almost as large as AT&T's. Furthermore, GTE claims that the merger would accelerate its consolidated revenue growth from its current level of 6–8% to 10–13% by 2001. Combined operating income is slated to reach approximately $10 billion in 1999 and increase at the rate of 15% per annum thereafter. Earnings-per-share growth would accelerate as a result of the merger to 8–10% in 1998 to 1999 and 18–20% per year in 2000 and beyond.

GTE acknowledges that the proposed transaction would have a significant near-term impact on its investment rating, but given the strong cash flow projections and planned debt reduction measures, the company would improve its credit ratios.

The Net Result

MCI's Internet backbone presence is more than a mere fringe benefit for GTE. GTE has ventured into the NSP arena by purchasing BBN (now called GTE Internetworking), but needs to improve its showing in this market if it is to succeed as a comprehensive telecommunications company. GTE Internetworking sells Internet access and service to plenty of corporate accounts, but its wholesale presence is minimal when compared with WorldCom's UUNET. In some instances, GTE Internetworking has struck agreements for shared line use with UUNET (as have many other Internet service providers and network service providers). It is not clear how strong a role this arrangement played in GTE's decision to bid for MCI.

GTE is planning a major expansion of its network through an agreement with Qwest Communications, a cable company that is laying a fiber optic network that virtually encircles the continental United States. Although this agreement will certainly strengthen GTE's backbone presence, the added Internet wholesale business found in MCI would be a huge boon.

From a regulatory standpoint, GTE has little to be concerned about from the combination of its Internet services with MCI's; it has more worries that regulators will not permit the two carriers to combine because of their phone services.

Will GTE Win?

The breakdown from nearly any angle yields the same result: Combining GTE with MCI is very similar to combining WorldCom with MCI, if not more logical. (GTE probably can help MCI's local phone business better than WorldCom can.) The deciding factor most likely will be whether MCI shareholders value cold, hard cash or valuable-but-volatile stock.

Step on a Crack, Break Your Country's Backbone?

An important issue in determining the value of MCI and the possibility of regulatory trouble for the potential mergers is how the deals affect the Internet backbone. The accompanying maps illustrate the *major* network access points for each of the players involved with the MCI deal. These points are limited to points of presence with very fast connections (i.e., bundled T3s or greater).

Although these maps do not provide a total view of each of the company's networks profiled, they give a rough estimation of the scope of their respective backbones and indicate the potential for peering relationships to be fostered or inhibited.

One caveat for readers: Several companies profiled are reluctant to reveal peering information. For this reason, the maps show network service provider presence at the public network access points

where peering occurs, but providers may also elect to peer at private locations. Private peering information is not yet available.

These maps are "version 1.0" of a living document, which will change as the major network service providers alter their networks and/or make more information available.

Figure 1 illustrates the points of presence for MCI. At press time, MCI had not yet released its connectivity routes. IDC expects these to be forthcoming and will update this map with route data as it becomes available.

Figure 2 shows a map of the major points of presence of the providers owned by WorldCom's Internet subsidiaries ANS, CompuServe Network Services, and UUNET. It does not show WorldCom's presence attributed to GridNet because all of the GridNet sites in the United States overlap existing sites from the aforementioned providers. Readers should note that GridNet's network complements the existing sites from ANS, CompuServe, and UUNET.

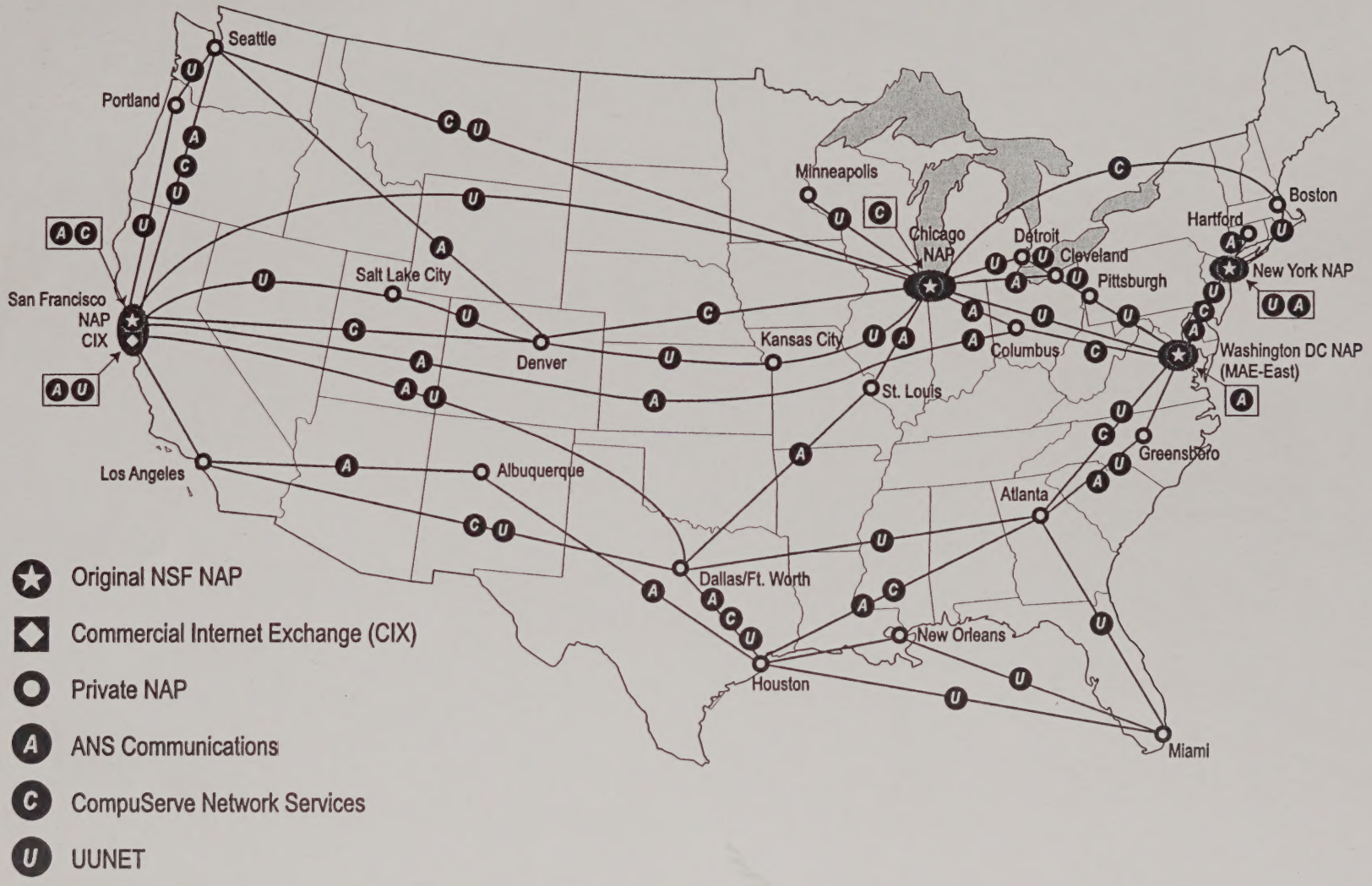
Lines connecting the points on this network may represent shared conduits or duplicate lines with the same origin and destination. The actual path of the lines from origin to destination may differ from what is shown on this map, but the points of origin and destination are accurate based on the information received from the providers.

Figure 3 is a map of the major points on GTE/BBN's backbone. Readers should note that some lines may not be the sole propriety of GTE, but instead are leased from UUNET or another provider. This map also does not show GTE's anticipated presence attributed to the fiber optic system under development by Qwest Communications. This new network is expected to greatly expand GTE's presence.

FIGURE 1: MCI MAJOR BACKBONE PRESENCE

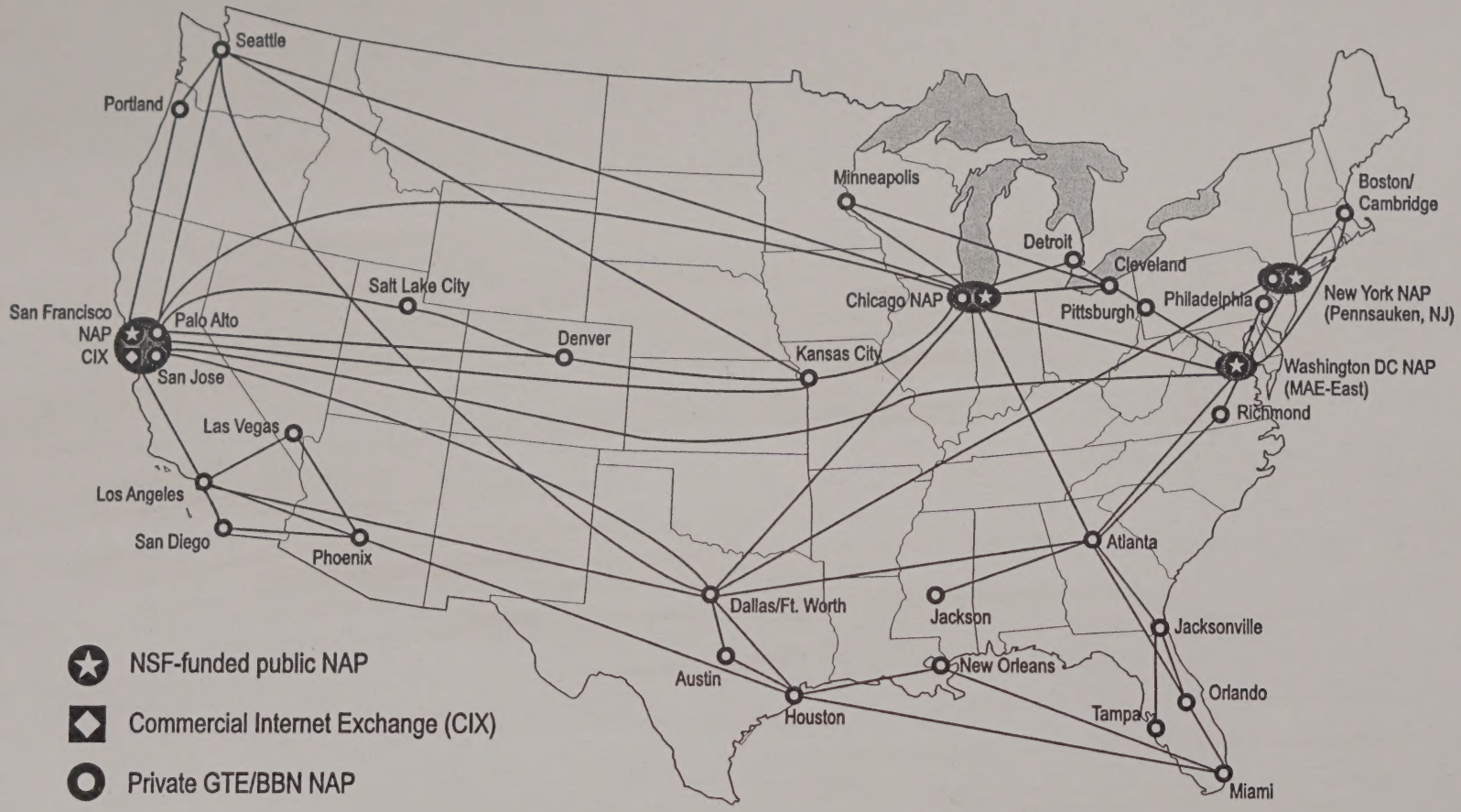
Source: International Data Corporation, 1997

FIGURE 2: ANS, COMPUSERVE, AND UUNET MAJOR BACKBONE PRESENCE



Source: International Data Corporation, 1997

FIGURE 3: GTE/BBN MAJOR BACKBONE PRESENCE



Source: International Data Corporation, 1997

Computer Industry Report

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THE GRAY SHEET

Global market intelligence on the information technology industry since 1964.

Is the PC Sales Channel a Dinosaur?

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October 1, 1997
IDC #14460
Vol. 32, No. 14

By any standards — except for those of some nascent technology markets — the PC industry is a fast-growing industry. With more than 10% growth year on year in the United States through 2001, the PC industry enjoys far better growth than industries outside the realm of information technology — like the automobile industry, the textile industry, and so forth.

Ironically, however, the sales channel that thrives off the growth of this technology may be going the way of the dinosaur long *before* PC growth tapers off. What could kill it? Today's PC market offers its own metaphorical forms of meteors and global cooling:

- The traditional, indirect channel structure of the PC business is becoming obsolete as the high penetration of corporate accounts requires more direct customer contact.
- Traditional assumptions about PC price points and performance are becoming obsolete as the consumer market — the next greenfield opportunity — values lower price points over higher performance.
- The vision of the PC as the primary end-user access device is becoming obsolete as new device classes promise to dramatically expand the market.

The maturation of the commercial PC business and the increasing maturation of other segments of the IT industry are the forebears for the above apocalypses. Early in the life of the commercial PC market, buyers realized it took more money than merely the unit price to establish a PC network. Installation and maintenance costs became big issues in the purchase decision and now that the corporate markets are saturated, vendors that developed service relationships with their customers have positioned themselves better than the vendors that concentrated solely on moving boxes.

Maturation, combined with some other factors, also spurred the drop in price points — as vendors are trying mightily to crack the stubborn consumer market. Meanwhile, the growing acceptance of network

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Associate Editor
Rick Miller

Production
IDC Publishing Services & Technologies

Editorial Advisers
Donald C. Bellomy, Doug McLeod
Lloyd Cohen, John Gantz
David Vellante, Gigi Wang
Bruce Stephen, Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573, Oxon Hill, MD 20750-0573

■

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computers, personal digital assistants, and other PC alternatives is working to break the PC's rule of the communications jungle.

Is the PC itself in danger of disappearing? Absolutely not. But the way in which PCs are marketed and sold certainly is destined for change. Will the flow of business — from vendor to distributor to dealer to customer — become extinct, replaced by more streamlined channels based on direct vendor involvement? Perhaps implying that the middlemen in the PC channel will march into demise like the T-Rex is too drastic, but they may come to represent the Komodo dragon of the industry: strong enough to survive the test of time but relegated to a supporting role in their ecosystem by more efficient organisms.

This issue of *The Gray Sheet* will examine the dynamics at work in the U.S. PC sales channel and provide some data to illustrate the changing climate in one of the IT industry's most important segments. In this issue we also provide channel analysis gleaned from IDC's recent *PC Market Outlook Conference*.

FACTORS BEHIND THE CHANGES

BUILDING A RELATIONSHIP

First factor in the dynamic PC sales channel: The complexion of PC demand is changing. Originally, the typical PC sale was made to a large corporate account via a dealer or distributor specialized in selling into the commercial segment. PC vendors filled shipment orders then washed their hands of the deal and moved on to the next order. In the early days, follow-up service was an afterthought.

However, the first-time corporate PC buyer basically has become extinct. In the United States, the ratio of PCs for every desk worker is 1.1:1.0. Although PC shipment growth continues healthily, the corporate PC market largely will be a replacement business, and vendor/buyer interaction will be more a relationship than a transaction.

The key message from this data is that although excellent opportunities for selling PCs to the corporate market will continue, capturing those opportunities will require new approaches. The old success model — in which suppliers could "ship and run," dumping PCs at the corporate customer's or reseller's loading dock and quickly moving on to the next stop — is obsolete.

For PC suppliers, growth will increasingly come from developing an intimate understanding of corporate customers' PC management life cycles. Thriving in the new PC market will require a radical shift in strategy: suppliers must establish direct lines of communication with as many customers as possible, and it may require bypassing the channel for a direct-sales model.

WELCOME LOW-PRICED PCS

A second factor potentially contributing to the demise of the PC sales channel is the growing acceptance of a sub-

$1,000 price band for desktops. In December 1995's *IDC Executive Insights,* "Predictions '96: A Pivotal Year as the Industry Shifts Gears" (IDC #10885), IDC predicted that the industry would slash entry price points to $800 or $1,000 and below in 1996 and 1997 in order to drive household penetration. The data for 1997 is not yet in, but early indications are that the sub-$1,000 systems are flying off the resellers' shelves and that home penetration is on its way up once again as a result.

But the proliferation of sub-$1,000 PCs will put further strain on the traditional PC sales channel. Margins on desktop PCs are already very low. Meeting the magic $1,000 point puts additional pressure on vendors and their channel partners. Again, the opportunity to reduce the cost of goods sold rears its head in the form of direct sales.

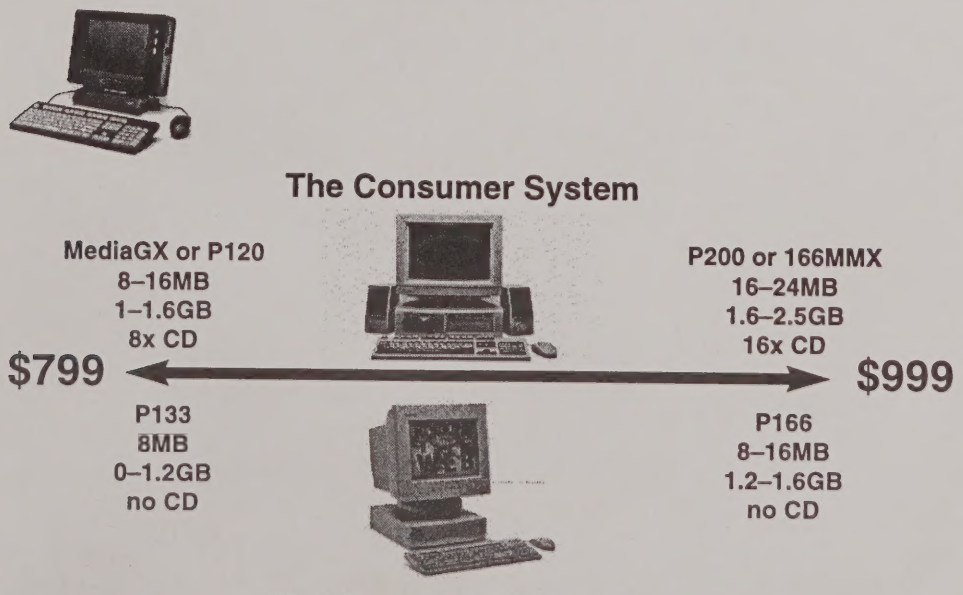
Price points will continue to change (down), driven by a new market imperative: increasing penetration of the home market. This, in turn, means that PC and chip suppliers must abandon traditional strategies that focus only on driving up performance at fixed (high) price points, and they must actively pursue strategies that aim at driving down prices for "acceptable" performance levels (see Figure 1).

This imperative represents a Copernican Revolution in PC product philosophy and fundamentally challenges suppliers like Intel that are focusing on performance and are yielding leadership in designs that drive down PC price points. The announced purchase of Cyrix by National Semiconductor suggests renewed competition in PC microprocessors may develop around this price point rather than a performance schism.

Data Communications: Not Just PCs Anymore

A third factor that will alter the business status quo in the PC sales channel will be the threat from alternative technologies (see Figure 2). The lure of the Internet is calling potential purchasers from all walks of life and all levels of computer savvy. Some of these users may forego a PC for another type of information access device because they know they have no need for advanced computing functions and don't wish to pay extra money for them. Other potential buyers, especially in the consumer segment, may

Figure 1
The New Products



Source: IDC's *PC Market Outlook, 1997*

choose an alternative to a PC because of pure intimidation. A user-friendly set-top box device may be more appealing to the novice Web surfer than would be a machine that requires a complicated installation procedure and a rudimentary ability to manipulate an operating system.

How directly will alternative technologies affect the established PC sales channel? At this point in the forecast period, it's difficult to say. However, most PC vendors are focusing on increasing margins through high-end products like servers and portables rather than exploring offerings in alternative technologies. Consumer electronics companies already are manufacturing smart phones, personal companions, and other technologies that can take the place of the PC — if only for the simple task of providing e-mail and/or Internet access.

CURRENT PC CHANNEL WATERS

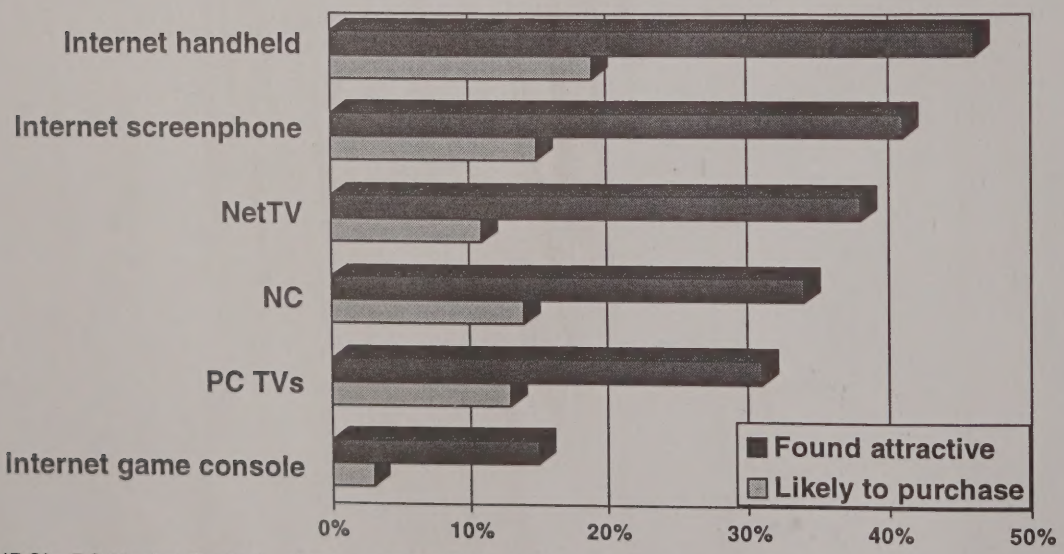
Just how susceptible to a shakeup is the PC channel? The situation for resellers and retailers may not be completely dire, but quarterly indicators certainly show the influence the direct-sales model is having throughout the industry. As Dell and other direct-sales vendors bask in the glory of quarter-on-quarter sales increases and all the media attention this success creates, the established indirect vendors are paying increased attention to the direct model.

During the first half of 1997, the direct channel closed the gap in distribution share with commercial channels by 5.6 percentage points, as reported in *U.S. PC Distribution Channels 2Q97 Review* (IDC #14391). This continuing trend has accelerated reengineering efforts in the sales, marketing, manufacturing, and delivery activities of resellers and vendors selling through resellers, which see significant portions of their installed base being eroded (see Figures 3 and 4).

The ease-of-doing-business factor has become a serious competitive advantage. Without the encumbrance of multiple layers of resellers, the directs have been quicker and more responsive to end-user requirements. This fact has not been lost on the major suppliers to the indirect channel. Much discussion is taking place with their partners on how best to modify operations, beyond mere assembly programs, to include the total customer experience from sourcing to support and services.

Related to the simplicity of doing business is the emergence of the Internet as a vehicle to bring customer and system provider closer together. As the direct sellers enhanced their

FIGURE 2
CUSTOMER DEMAND IN THE HOME PLATFORM



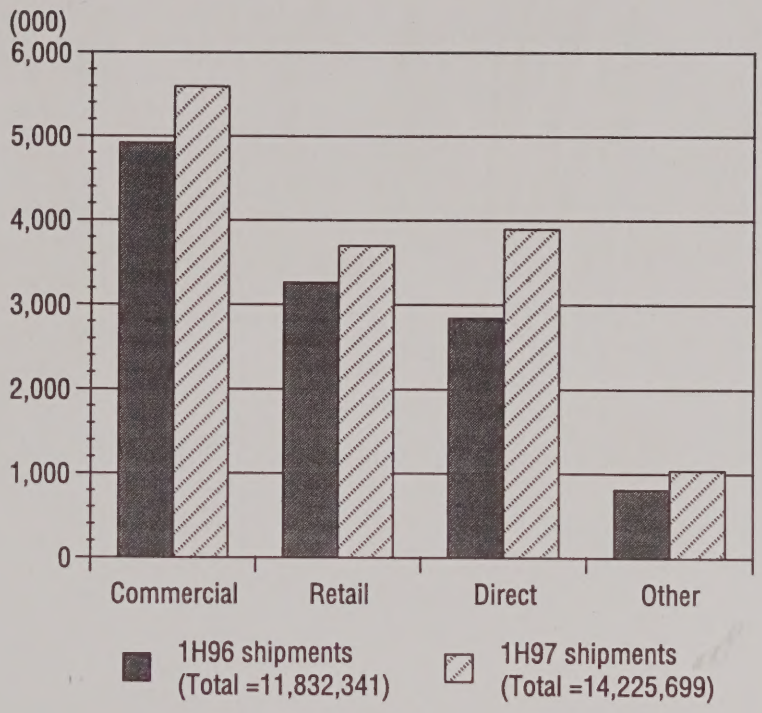
Source: IDC's *PC Market Outlook, 1997* and IDC/LINK's *1997 Info Appliance Survey*

sites with online services, configurators, and the like, the channel countered with similar Internet functionality that featured sophisticated multivendor configurators and pricing tools.

In commercial channels the second quarter marked a significant period for redefinition of their business models. Both the OEM and reseller communities finally acknowledged that their highly interdependent business models must change to become more efficient. During the first half of 1997 both communities went beyond words and intentions to actually committing to reengineer their "mutual operations." Channel assembly is the most recognized piece of this redefinition and has become identified as the means for increasing efficiency, margins, fill rates, and customer satisfaction.

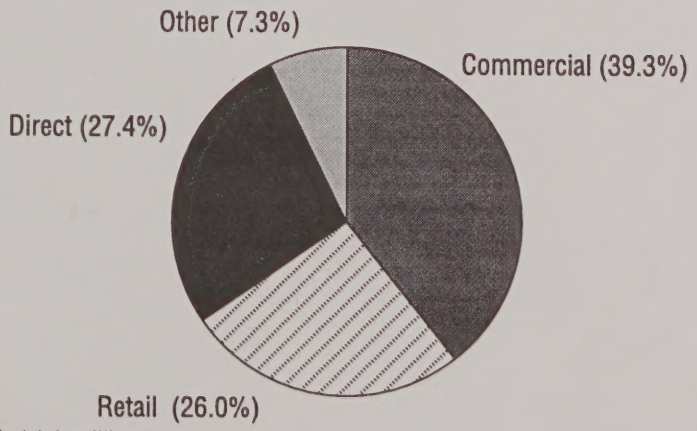
Dealers aren't the only ones to feel the heat from direct vendors. Retailers too are struggling. The question still remains: Can anybody be profitable selling desktop and notebook PCs in retail? In order to be profitable, manufacturers must sell a certain mix of high-end and low-end products. Retail lends itself to low-end sales, which are costly for a manufacturer to support. No one likes being caught in the "the more we sell, the more we lose" cycle and it remains to be seen whether major vendors will de-emphasize retail and focus on high end.

FIGURE 3
U.S. PC UNIT SHIPMENTS BY BROAD CHANNEL TYPE, 1H96 VERSUS 1H97



Source: International Data Corporation, 1997

FIGURE 4
U.S. PC UNIT SHIPMENT SHARE BY BROAD CHANNEL SEGMENT, 1H97



Total: 14.2 million units
Source: International Data Corporation, 1997

POINT/COUNTERPOINT: WHY DIRECT SALES MAY NOT RULE THE WORLD

Despite that direct sellers are bullying their way into the U.S. PC market, the channel still offers benefits that direct resellers miss out on.

Resellers are focusing on adding value to the buyer/seller relationship through a variety of services. Many resellers provide financing options and take responsibility for outstanding funds and collection, and some resellers are providing asset management services, as well.

Ironically enough, channel partners also provide customization and support for direct vendors, as well as vendors that rely on indirect means. For example, a corporate client accustomed to purchasing through a reseller suddenly may decide he wishes to change to direct-vendor Dell's machines. However, the customer may decide on a configuration that Dell can't provide from its choice of components available to its assembly line. The customer may enlist its trusted reseller to call Dell and order the machines as fully configured as Dell can provide them, then the reseller will finish the custom work. (This scenario can work the opposite way, as well: Dell may have a loyal account that needs a custom order filled, thus Dell will call a reseller to perform the modifications.)

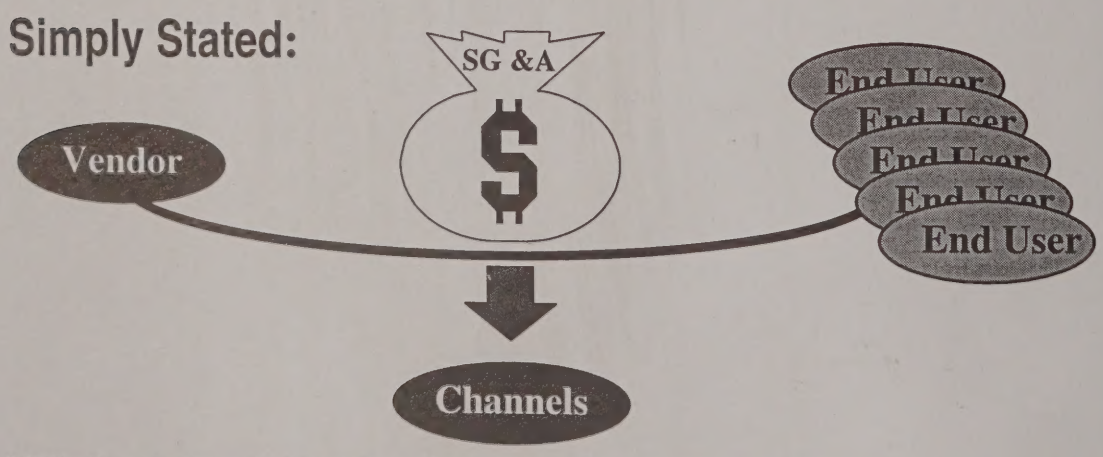
In the midst of the direct-sales versus indirect-sales debate, one motto rings true: nothing is free. Traditional vendors seeking to shift to a direct-sales model will be forced to realize ancillary costs usually absorbed by the channel. To ensure that their customers remain satisfied, direct vendors have to have established service channels, an administrative policy for handling returns/defective merchandise, and in some cases the ability to provide financing. These services cost vendors money, simply put.

Figures 5 and 6 illustrate the different distribution of costs in direct versus indirect sales models, respectively. The most telling detail may be in the note at the bottom of Figure 5: Net income = gross income - SG&A. As direct vendors cut out the middlemen, they assume the costs of the services the channel traditionally provides. To one degree or another, overhead will increase.

For indirect vendors, the channel also eliminates some of the logistical issues associated with the PC business, such as shipping. Direct vendors are assuming shipping costs for each customer as opposed to making cost-efficient, large-quantity delivery dumps to resellers or distributors.

The real test for the direct and indirect sales models will be to find and meet the customer priorities at the time of purchase. Cost perennially will be an issue, but cost isn't the sole decision factor for corporate PC

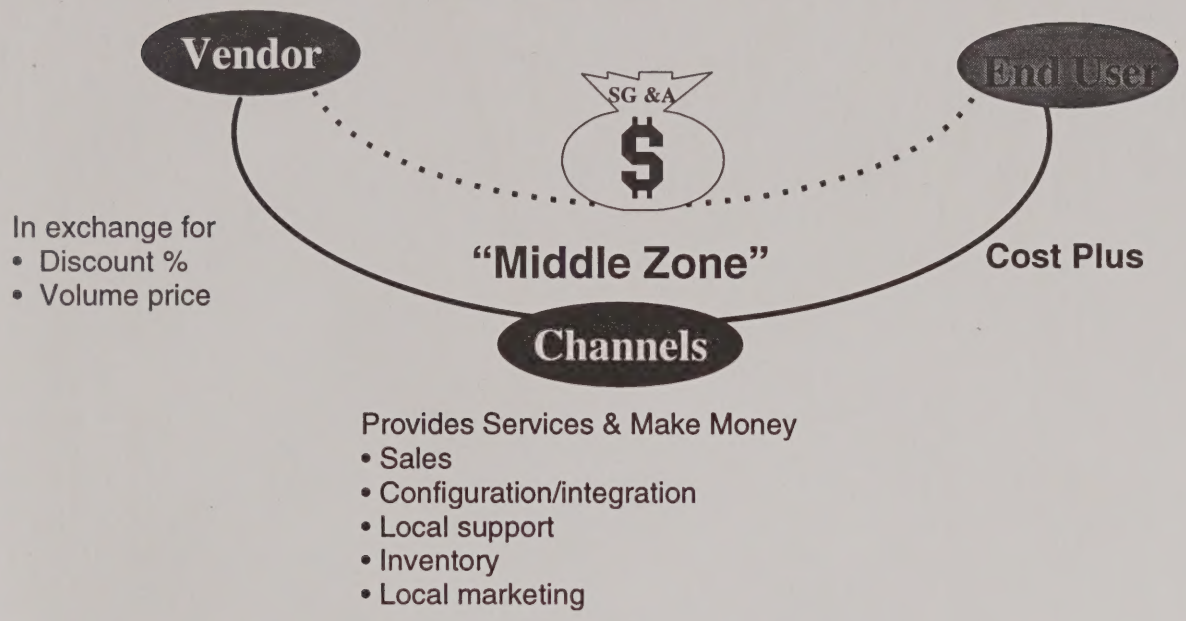
FIGURE 5
DIRECT VS. INDIRECT



Rev - COGS = Gross Income - SG&A (salaries, commissions, overhead) - R&D = Net Income

Source: IDC's *PC Market Outlook, 1997*

FIGURE 6
DIRECT VS. INDIRECT: CREATION OF THE "MIDDLE ZONE"



Source: IDC's *PC Market Outlook, 1997*

purchases. As shown in Figure 7, design, installation, and support and ease of purchase are two very important decision factors in the PC buying process. Resellers and local contacts commonly are associated with better service, and resellers are working to make purchasing as easy as calling a direct seller.

The virtual supply chain may help resellers improve the ease of purchase. The virtual supply chain concept, as it applies to the PC industry, is a business and information system that eliminates overlapping activity by channel partners by defining which members of the channel perform certain functions the best and delegating these functions accordingly. Inventory and shipping data is tracked through the channel using the Internet and electronic data interchange.

The biggest gain the virtual supply chain may provide for indirect vendors is the ability to reduce the time product spends in the channel. Figure 8 shows the time advantage direct vendors currently enjoy. Indirect vendors can recoup some of the direct vendors' price advantage by taking advantage of declining component parts if they can streamline the channel process.

THE CUSTOMER IS ALWAYS RIGHT

The debate about direct sales versus indirect sales will continue as long as companies like Dell make waves with the established indirect-sales vendors, but a simple fact remains: PC buyers want to buy machines with timely delivery, reliable support, and a fair price — and they don't care much about channel differences.

As noted in the previous figures, players in the indirect channel must make gains in timely delivery and customer contact to provide the type of relationships corporate clients now demand. And direct vendors and indirect vendors alike will be forced to bite the bullet and develop low-margin products for the price-sensitive consumer market — or face losing market share in the consumer segment to fast-developing PC alternatives.

The traditional PC channel may not be a complete dinosaur, but it will be forced to evolve.

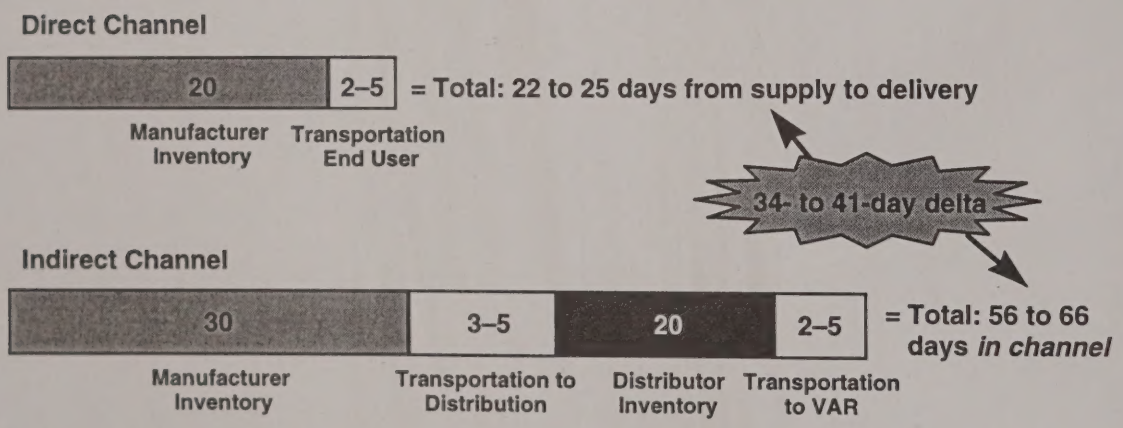
FIGURE 7:
DIRECT VS. INDIRECT: THE REAL VALUE OF — VALUE ADD!

Q: Other than price, which of the following is the primary reason for your decision to buy from your selected source?

Reason	PC	Server
Delivery/availability	12.7%	7.6%
Design, installation, support	47.1%	49.1%
Ease of purchase	21.3%	25.0%
Custom configuration	12.6%	12.9%
Other	5.0%	2.3%
Don't know	1.3%	3.0%

Source: IDC's *PC Market Outlook, 1997*

FIGURE 8
CAN THE VIRTUAL SUPPLY CHAIN ELIMINATE COST?
INVENTORY DAYS ANALYSIS



What happens to component pricing in the 34-day period?
What happens to finished goods pricing shortly thereafter?

Source: IDC's *PC Market Outlook, 1997*

PC MARKET OUTLOOK BINDERS AVAILABLE

IDC is offering binders summarizing presentations from the 5th Annual PC Market Outlook for $100. Interested parties can contact Dara Queen at (508) 935-4585 or dqueen@idcresearch.com.

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Global market intelligence on the information technology industry since 1964.

The Web: Who, Where, When, and Why?

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August 15, 1997
IDC #14246
Vol. 32, No. 11

Nearly any news story touting the burgeoning of the Internet and World Wide Web is an exercise in redundancy these days — but this issue of *The Gray Sheet,* which will do said touting, is supported by fresh data from IDC surveys and proprietary models that lend credence and quantification to the Internet's rosy outlook.

What and how much opportunity does the Internet offer?

Building the Internet — the hardware, software, data communications equipment, and services associated with creating networks and Web sites — accounted for revenue of $19 billion in 1996. This revenue will increase to $92 billion in 2000, and these measures are conservative; IDC measured only tools and services for which the *primary* purpose was Internet enablement. Billions of dollars' worth of servers, PCs, and networking equipment will provide Internet connectivity as a secondary purpose behind designated business or entertainment functions.

However, the $92 billion associated with building the Internet is eclipsed by the money that will be made through commerce on the Internet. By 2000, $123 billion will be exchanged in Internet commerce, making the World Wide Web a significant sales channel for products of IT-related and non-IT-related ilk. The following year, 2001, commerce over the Internet will jump to $223 billion worldwide.

Where should savvy vendors turn to find this opportunity? Although Web use is exploding everywhere, certain geographies and user segments will reach a critical mass of opportunity faster than others:

- The United States will hold the lion's share of Web users throughout the forecast period. In 1996, 58% of Web users lived in the States; in 2001, this percentage drops to only 54%.
- The United States will do the most purchasing on the Internet. In 1996, nearly all Internet commerce occurred in the States; in 2001, 70% of Web commerce will still happen there.
- Asia/Pacific (excluding Japan) exhibits the greatest

THE GRAY SHEET
Associate Editor
Rick Miller

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Donald C. Bellomy, Doug McLeod
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Bruce Stephen, Frank Gens

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Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573, Oxon Hill, MD 20750-0573

■

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growth in online commerce, with 1996–2001 year-on-year expansion of 179%. However, growth in other regions trails that of Asia/Pacific only slightly.

- Although more than 50% of Internet commerce stemmed from home users in 1996, business-to-business transactions will increase throughout the forecast period. Eventually, purchases in the home segment will account for only 20% of Internet commerce.

In the midst of Web euphoria, however, vendors should heed several warnings.

First and foremost, the Internet, despite its tremendous growth, remains a channel for vendors to sell and market product; it does not replace or fundamentally enhance the product.

Second, the attributes that make the Internet an efficient sales and marketing channel won't replace intelligent sales and marketing techniques, but they may accelerate the rate at which buyers dismiss efforts from less savvy vendors. As in the real world, timing and location on the World Wide Web will be important for marketing, and clear communication will be essential for sales.

Yet another concern, which varies in its magnitude from minor annoyance to Armageddon, depending on the outlook and background of the forecaster, is the Internet's ability to withstand the demands that the onslaught of new users will place on its networks. Although data communications equipment providers undoubtedly salivate at the prospect of the continuing demand for broader communications pipes, it behooves Internet commerce vendors to invest in networks that offer speed and reliability to their customers. When competition is but a mouse click away, speedy delivery of information can make the sale.

The data in this issue of *The Gray Sheet* is based on findings from IDC's recently published report *The Global Market Forecast for Internet Usage and Commerce* (IDC #13855, July 1997). This report — based on IDC's working model for tracking Internet growth and activity, called the *Internet Commerce Market Model*™ — provides insight into the trends in Web use, Internet commerce spending, total Web page count, and bandwidth demands.

IDC's Web Index

One output of the *Internet Commerce Market Model* is the *IDC Web Index,*™ which has been designed to yield a single measure of Internet commerce activity. The index is based on three variables in the following equation:

$$\textit{IDC Web Index} = \frac{\text{Web hours}}{\text{Web pages}} \times \text{Transaction activity}$$

Web hours are the number of hours that IDC's primary research shows users stay online in a month, multiplied by the number of users that month. **Web pages** are worldwide figures for the number of URLs either obtained from industry sources or forecast by IDC.

Transaction activity is a coefficient that represents the number of dollars users spend buying products or services over the Web in one month compared with the corresponding amount spent in December 1995. Transaction activity is defined as the buying and selling of goods and services over the Web. It excludes access charges, funds transfer, stock trading, or service and support; it also does not take into account transactions and other forms of commerce that do not involve purchase (for example, account update, inquiry, and product evaluation).

The index itself was normalized at 100 as of December 31, 1994. When new information is incorporated into the model, the index is adjusted — just as the Dow Jones average of 30 industrials is adjusted for stock splits. (By adhering to a fixed starting point, comparisons across time periods can be made more easily, yielding a more accurate picture of growth and decline.)

IDC believes that the *IDC Web Index* is the single best shortcut to understanding the key dynamics of commerce over the World Wide Web. For Web storefront developers, Internet mall owners, content owners, and others who seek to market products and services to the online community, it offers a measure for estimating return on investment (ROI) for development. Detailed analysis will also reveal which market segments show the most potential over a given time period. For vendors of Internet servers, development tools, search engines, and security software, for example, the model offers a gauge of potential market demand for products in support of Internet commerce.

The *IDC Web Index* reflects the market in this manner:

- If the number of Web hours grows faster than the number of pages, the index and the ROI of developing a Web page rise. More hours (and eyes) are available to view each page.
- If the number of Web pages grows faster than the number of hours, the index and the ROI of a page fall. Competition is increasing for user time and mindshare.
- If the number of pages keeps pace with the number of hours, the key determinant of Web page ROI and the index becomes transaction activity. If the activity increases, each user is buying more off the Web, and the index rises.

Currently, the *IDC Web Index* reflects the following market dynamics:

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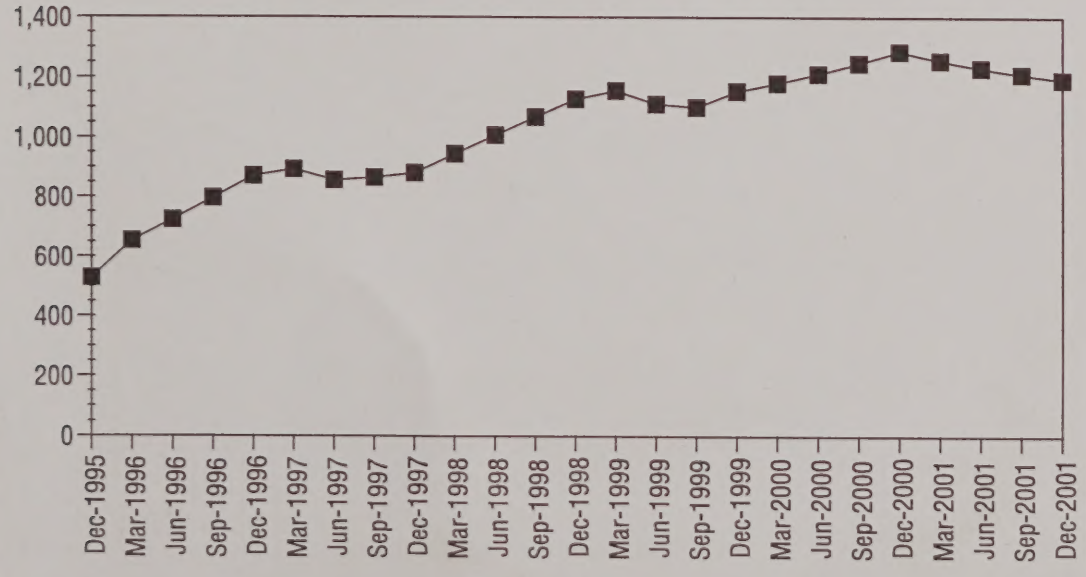

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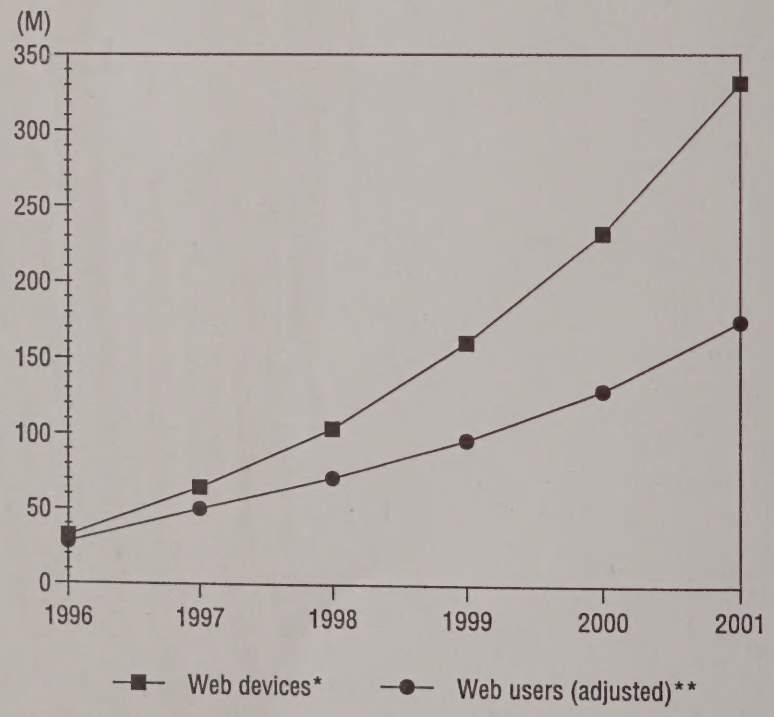

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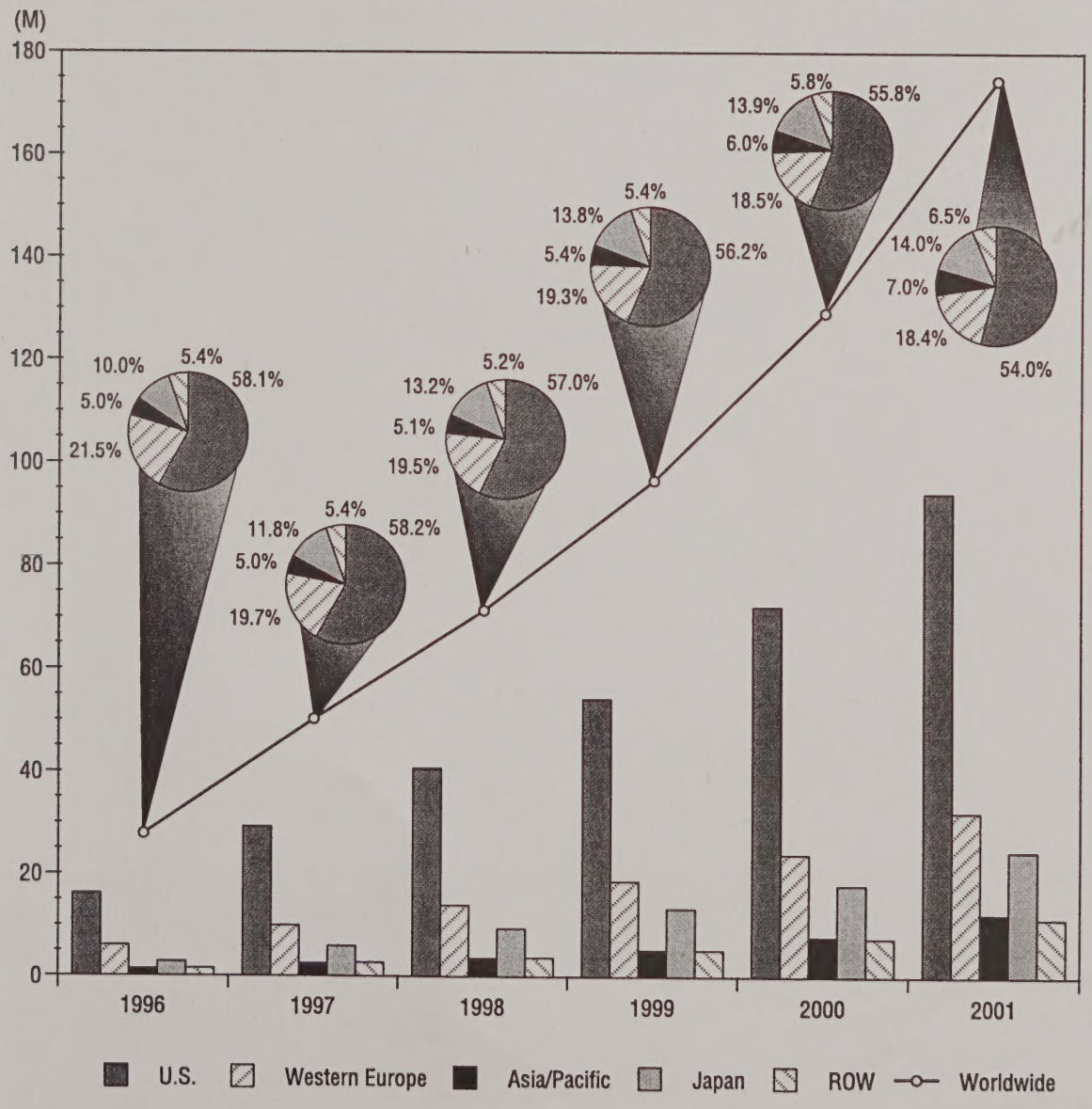

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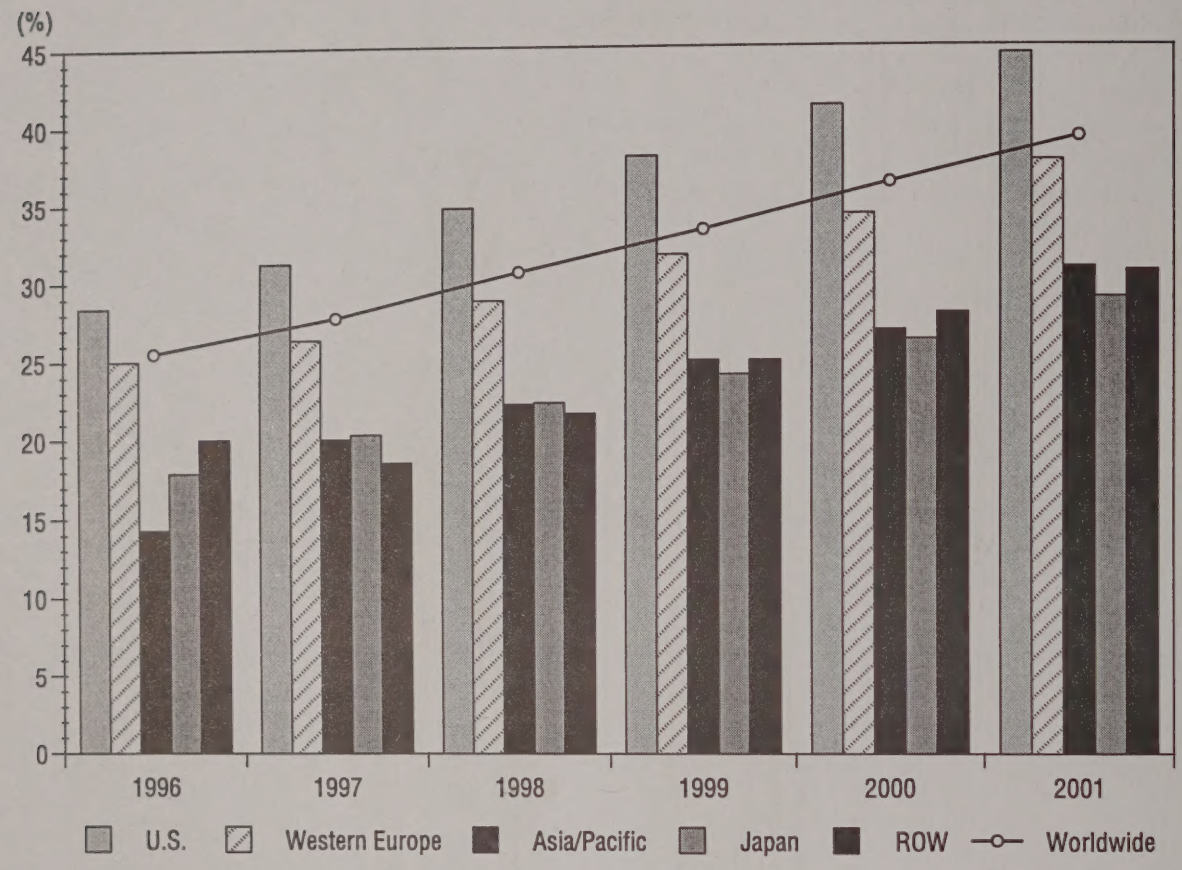

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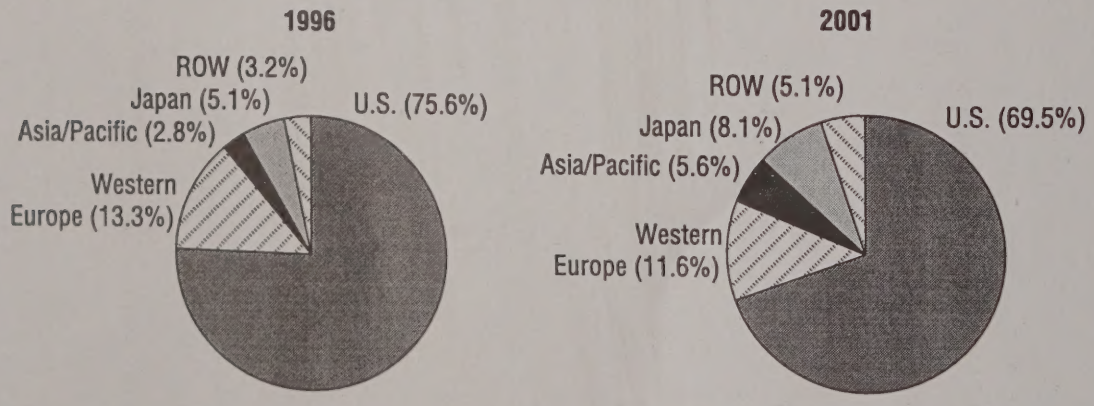

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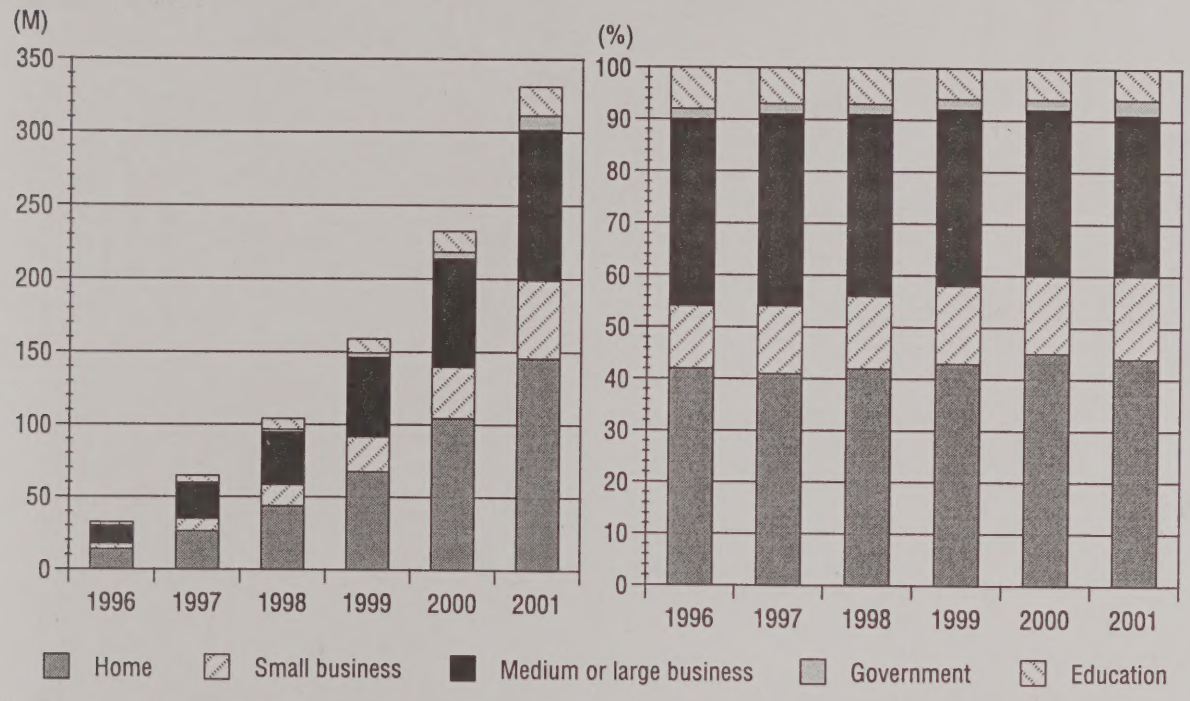

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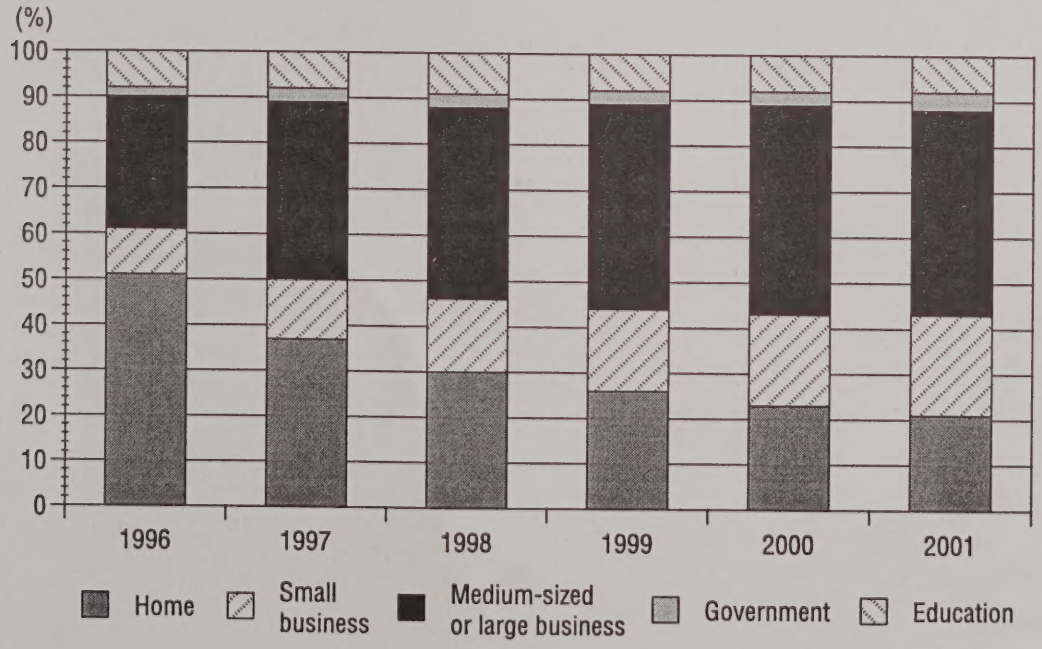

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Despite the stable distribution of Internet access devices among segments, a major shift will occur in the distribution of Internet commerce. More than 50% of Internet commerce stemmed from home users in 1996. This will change as businesses accept the Internet as a channel and as the size of business transactions increases.

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For instance, if the forecast of Internet users is extended another five years and some reasonable assumptions are made — about the sizes of file transfers, percentage of multimedia content, or potential access speeds, for example — developing a ballpark scenario for future bandwidth demand is possible.

Although this is only a pro forma demand sizing, if it's correct to an order of magnitude, it has major implications for Internet (and telephone) access 10 years hence.

As the bandwidth demand scenario figure shows, Internet traffic grows from mere noise in the overall worldwide communications system — dominated today by voice traffic — to something much more significant. Within 10 years, it will grow by three orders of magnitude; by 2006, it will equal voice traffic.

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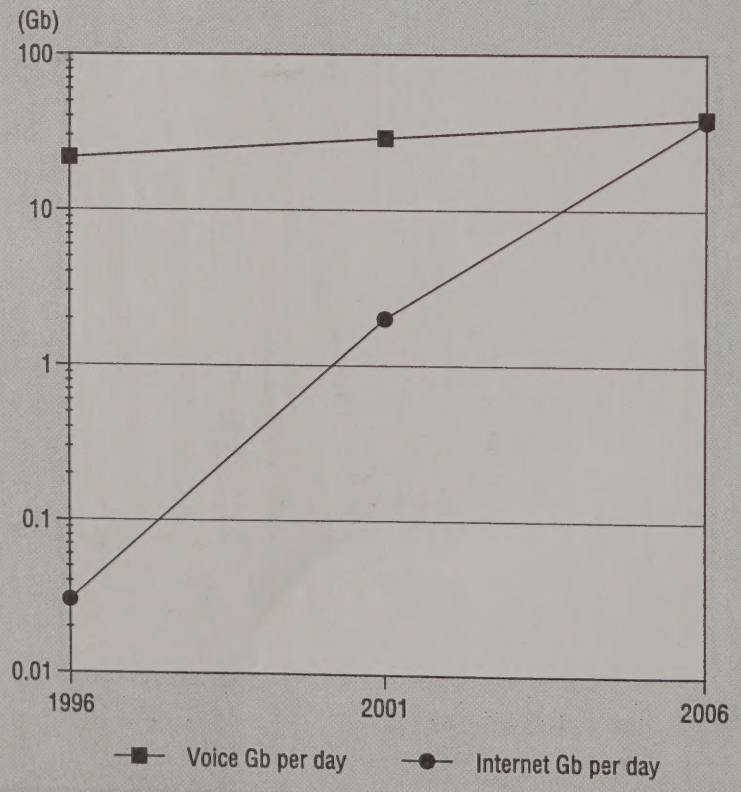

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Computer Industry Report

THE GRAY SHEET

Global market intelligence on the information technology industry since 1964.

The Web: Who, Where, When, and Why?

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August 15, 1997
IDC #14246
Vol. 32, No. 11

Nearly any news story touting the burgeoning of the Internet and World Wide Web is an exercise in redundancy these days — but this issue of *The Gray Sheet,* which will do said touting, is supported by fresh data from IDC surveys and proprietary models that lend credence and quantification to the Internet's rosy outlook.

What and how much opportunity does the Internet offer?

Building the Internet — the hardware, software, data communications equipment, and services associated with creating networks and Web sites — accounted for revenue of $19 billion in 1996. This revenue will increase to $92 billion in 2000, and these measures are conservative; IDC measured only tools and services for which the *primary* purpose was Internet enablement. Billions of dollars' worth of servers, PCs, and networking equipment will provide Internet connectivity as a secondary purpose behind designated business or entertainment functions.

However, the $92 billion associated with building the Internet is eclipsed by the money that will be made through commerce on the Internet. By 2000, $123 billion will be exchanged in Internet commerce, making the World Wide Web a significant sales channel for products of IT-related and non-IT-related ilk. The following year, 2001, commerce over the Internet will jump to $223 billion worldwide.

Where should savvy vendors turn to find this opportunity? Although Web use is exploding everywhere, certain geographies and user segments will reach a critical mass of opportunity faster than others:

- The United States will hold the lion's share of Web users throughout the forecast period. In 1996, 58% of Web users lived in the States; in 2001, this percentage drops to only 54%.
- The United States will do the most purchasing on the Internet. In 1996, nearly all Internet commerce occurred in the States; in 2001, 70% of Web commerce will still happen there.
- Asia/Pacific (excluding Japan) exhibits the greatest

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Associate Editor
Rick Miller

Production
IDC Publishing Services & Technologies

Editorial Advisers
Donald C. Bellomy, Doug McLeod
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David Vellante, Gigi Wang
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■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573,
Oxon Hill, MD 20750-0573

■

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growth in online commerce, with 1996–2001 year-on-year expansion of 179%. However, growth in other regions trails that of Asia/Pacific only slightly.

- Although more than 50% of Internet commerce stemmed from home users in 1996, business-to-business transactions will increase throughout the forecast period. Eventually, purchases in the home segment will account for only 20% of Internet commerce.

In the midst of Web euphoria, however, vendors should heed several warnings.

First and foremost, the Internet, despite its tremendous growth, remains a channel for vendors to sell and market product; it does not replace or fundamentally enhance the product.

Second, the attributes that make the Internet an efficient sales and marketing channel won't replace intelligent sales and marketing techniques, but they may accelerate the rate at which buyers dismiss efforts from less savvy vendors. As in the real world, timing and location on the World Wide Web will be important for marketing, and clear communication will be essential for sales.

Yet another concern, which varies in its magnitude from minor annoyance to Armageddon, depending on the outlook and background of the forecaster, is the Internet's ability to withstand the demands that the onslaught of new users will place on its networks. Although data communications equipment providers undoubtedly salivate at the prospect of the continuing demand for broader communications pipes, it behooves Internet commerce vendors to invest in networks that offer speed and reliability to their customers. When competition is but a mouse click away, speedy delivery of information can make the sale.

The data in this issue of *The Gray Sheet* is based on findings from IDC's recently published report *The Global Market Forecast for Internet Usage and Commerce* (IDC #13855, July 1997). This report — based on IDC's working model for tracking Internet growth and activity, called the *Internet Commerce Market Model*™ — provides insight into the trends in Web use, Internet commerce spending, total Web page count, and bandwidth demands.

IDC's Web Index

One output of the *Internet Commerce Market Model* is the *IDC Web Index,*™ which has been designed to yield a single measure of Internet commerce activity. The index is based on three variables in the following equation:

$$\textit{IDC Web Index} = \frac{\text{Web hours}}{\text{Web pages}} \times \text{Transaction activity}$$

Web hours are the number of hours that IDC's primary research shows users stay online in a month, multiplied by the number of users that month. **Web pages** are worldwide figures for the number of URLs either obtained from industry sources or forecast by IDC.

Transaction activity is a coefficient that represents the number of dollars users spend buying products or services over the Web in one month compared with the corresponding amount spent in December 1995. Transaction activity is defined as the buying and selling of goods and services over the Web. It excludes access charges, funds transfer, stock trading, or service and support; it also does not take into account transactions and other forms of commerce that do not involve purchase (for example, account update, inquiry, and product evaluation).

The index itself was normalized at 100 as of December 31, 1994. When new information is incorporated into the model, the index is adjusted — just as the Dow Jones average of 30 industrials is adjusted for stock splits. (By adhering to a fixed starting point, comparisons across time periods can be made more easily, yielding a more accurate picture of growth and decline.)

IDC believes that the *IDC Web Index* is the single best shortcut to understanding the key dynamics of commerce over the World Wide Web. For Web storefront developers, Internet mall owners, content owners, and others who seek to market products and services to the online community, it offers a measure for estimating return on investment (ROI) for development. Detailed analysis will also reveal which market segments show the most potential over a given time period. For vendors of Internet servers, development tools, search engines, and security software, for example, the model offers a gauge of potential market demand for products in support of Internet commerce.

The *IDC Web Index* reflects the market in this manner:

- If the number of Web hours grows faster than the number of pages, the index and the ROI of developing a Web page rise. More hours (and eyes) are available to view each page.
- If the number of Web pages grows faster than the number of hours, the index and the ROI of a page fall. Competition is increasing for user time and mindshare.
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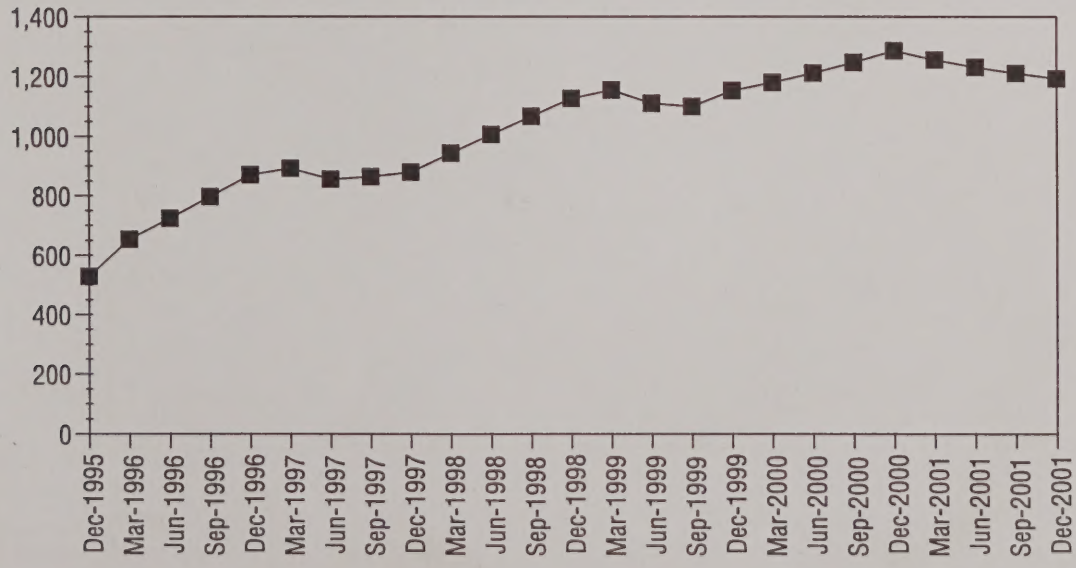

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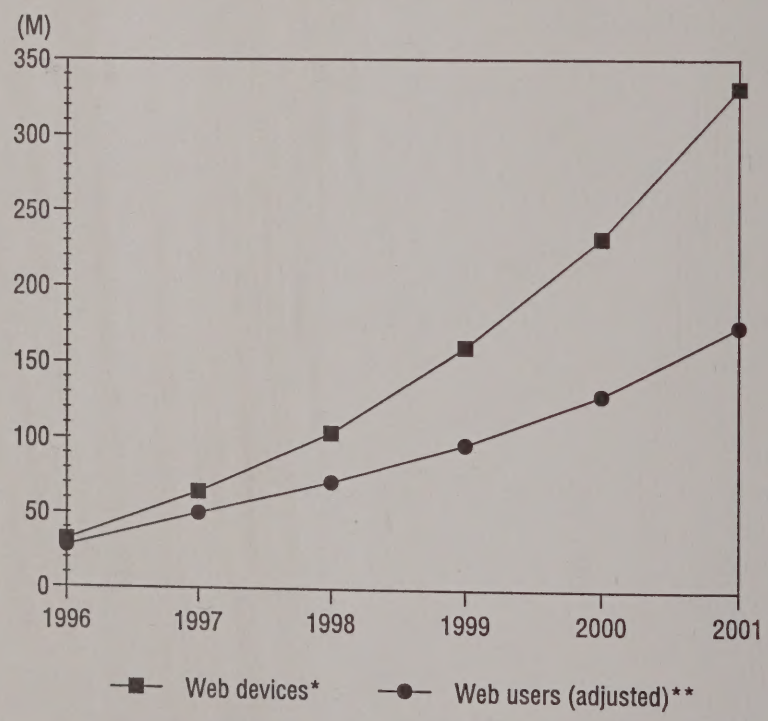

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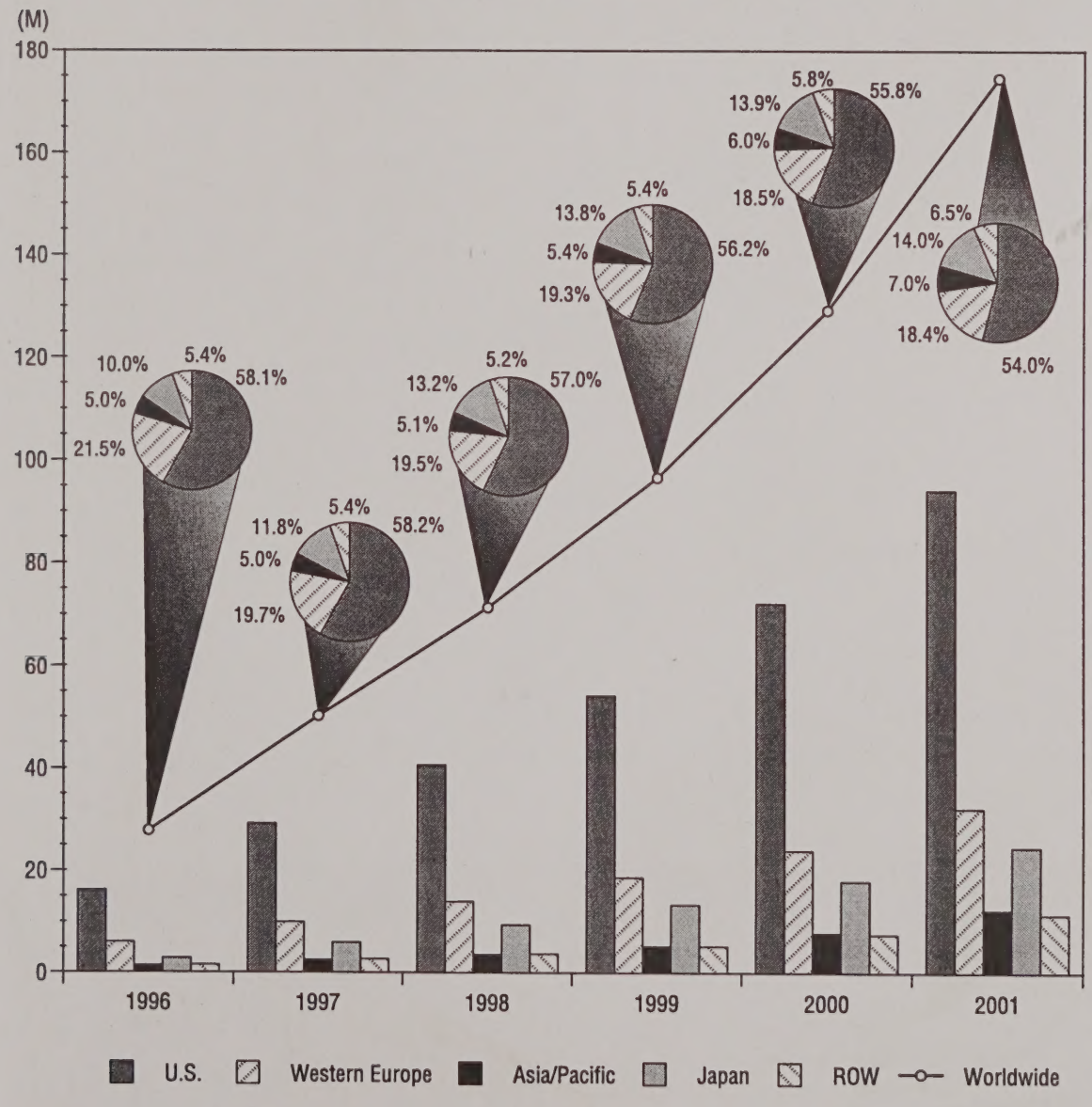

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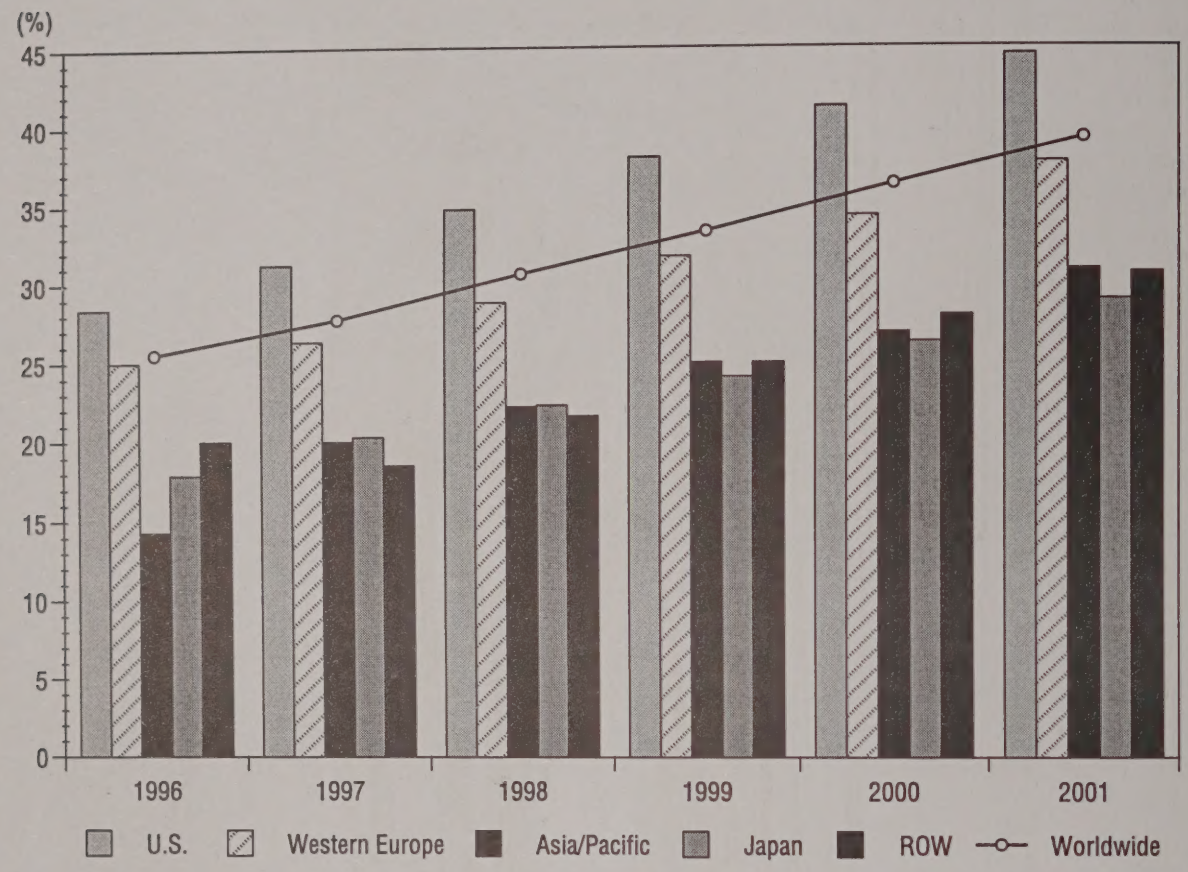

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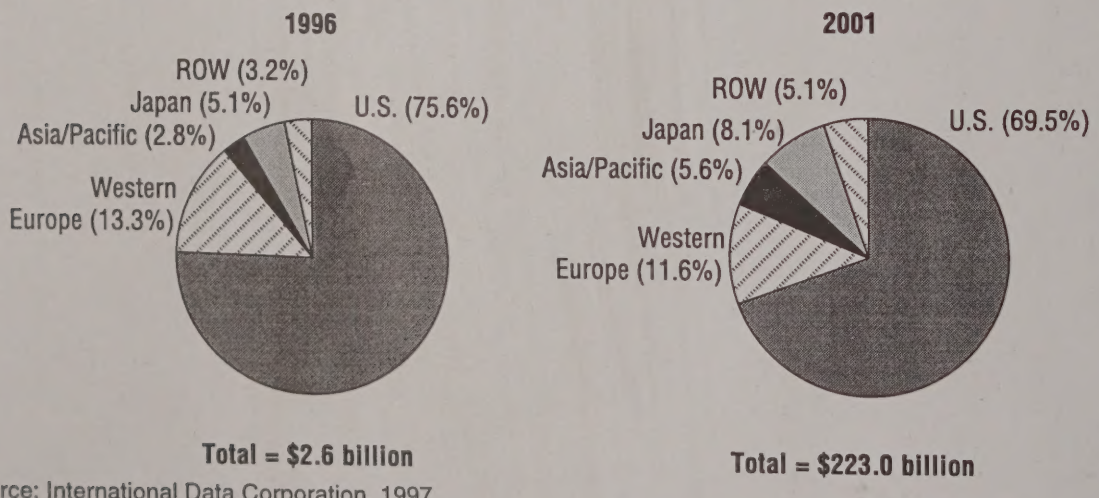

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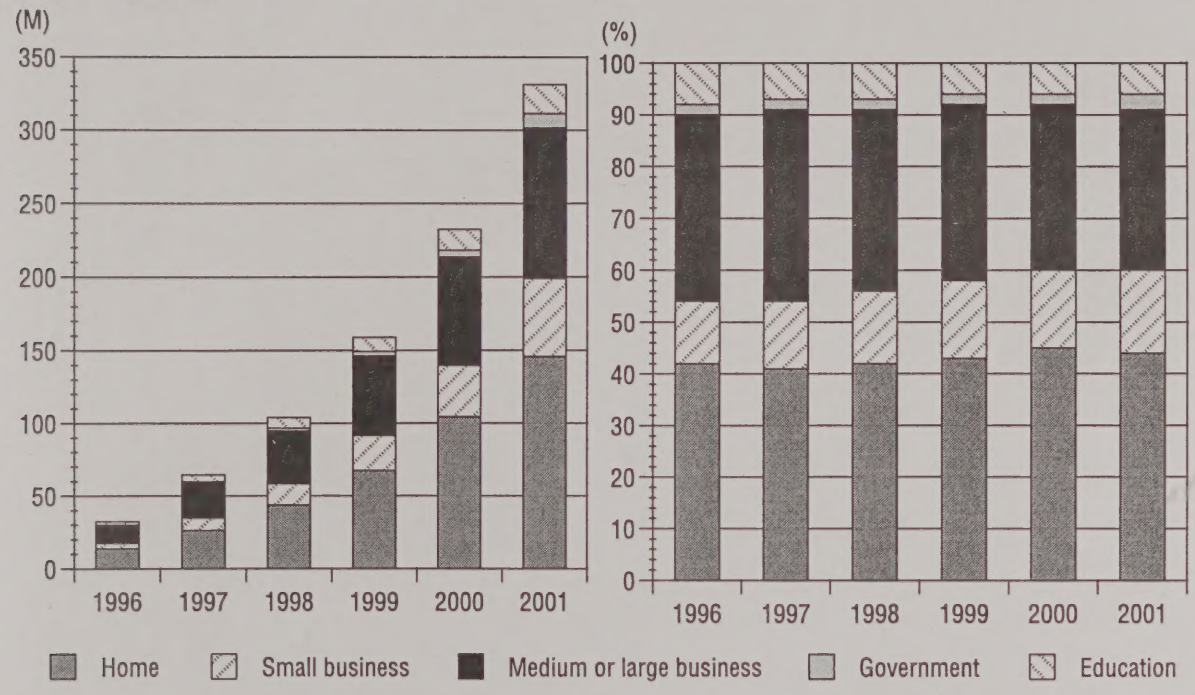

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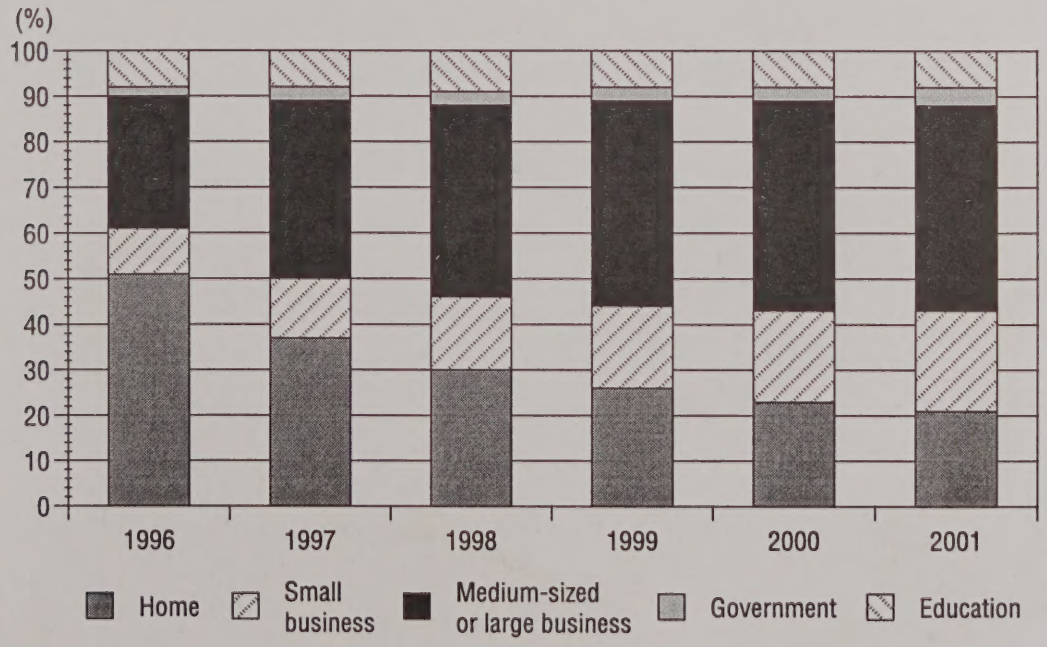

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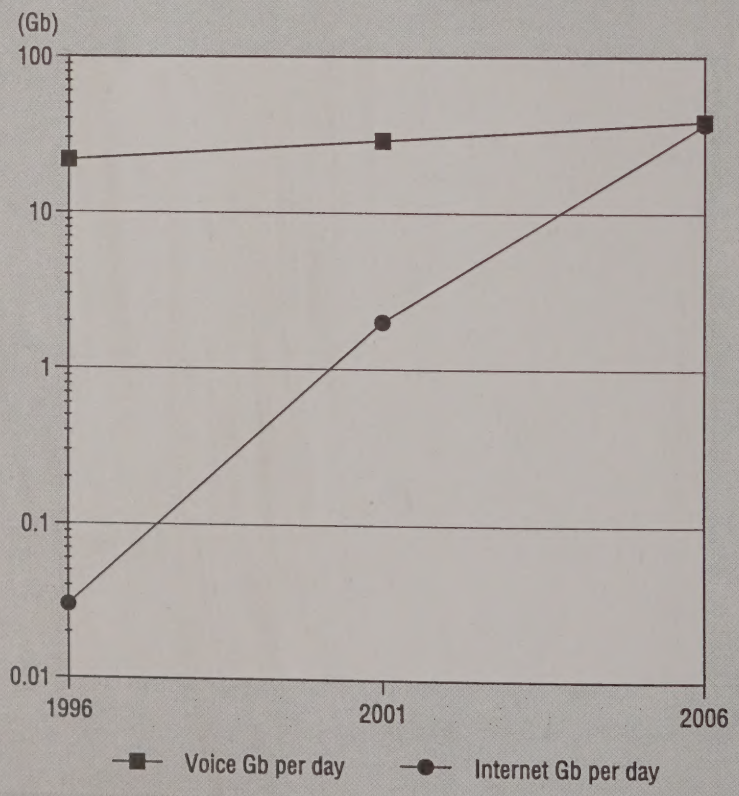

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Cast a Wide 'Net: Users' Need to Stay Wired Drives Handheld Computing and Messaging Devices

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August 1, 1997
IDC #14145
Vol. 32, No. 10

Is masochism running rampant through the information technology community? Findings from several recent IDC surveys argue it is. Although executives increasingly complain about information overload, more are turning to mobile devices to keep the information flowing.

What points to this collective desire to keep a thumb on the pulse of the worldwide flow of information? In short, the demand for e-mail does.

Nearly 66% of all computerized business sites in the United States will have some form of e-mail this year, according to the *1997 Global IT Survey.* (*Note:* Computerized means having at least one computer.) By the end of 1997, almost 90% of these sites (or 60% of all computerized U.S. businesses) will offer employees remote access to e-mail.

What makes e-mail such a killer application, and why the sudden need for businesses to enable their workers 24 × 7 access to it anywhere? E-mail has taken its place beside the telephone as an acceptable form of communication in the business world. It provides users with a simple, effective means to broadcast information to multiple recipients residing inside or outside the organization, and it offers documentation of communication. E-mail also offers implicit time-management benefits, allowing users to respond to messages and queries in the order most beneficial to their agendas.

Now that users have — and usually take advantage of — this tool while in the office, they are searching for ways to extend its benefits beyond their desks.

Nearly 10% of the workforce equipped with e-mail telecommutes at least one day per week, and 14% of the workforce travels on business at least once per week. On a weekly basis, the average telecommuter works 2.2 days at home, and the average business traveler is out of the office 2.9 days. This accumulates to a significant

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Associate Editor
Rick Miller

Production
IDC Publishing Services & Technologies

Editorial Advisers
Donald C. Bellomy, Doug McLeod
Lloyd Cohen, John Gantz
David Vellante, Gigi Wang
Bruce Stephen, Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573, Oxon Hill, MD 20750-0573

■

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amount of absence from the office. E-mail fills this void and in most cases offers the ability to transfer value-added data, such as attached word processing or spreadsheet files.

The need to remain within the loop of digital communication is a driving force behind two fast-growing segments of the IT hardware industry: portable computers and smart handheld devices. Portable computers, which by no means are new devices and are driven by other functions besides e-mail, will display 16% worldwide shipment growth from 1997 to 2001. However, smart handheld devices, which are relatively new products and are driven significantly by their ability to offer portable e-mail access, will experience an astounding 55% worldwide compound annual shipment growth from 1996 to 2001.

How will user demand and product capabilities expand both the market for smart handheld devices and the number of mobile messaging users? Two recent IDC surveys provide details. IDC's *Mobile Messaging Survey* offers insight to the dynamics at work in the overall mobile messaging market, and IDC's *1997 Smart Handheld Devices Survey* offers specific details about the demand-side preferences driving this segment of the single-user hardware industry.

This issue of *The Gray Sheet* examines the results of these surveys and compares these results with market trend data accumulated on a year-long basis.

MESSAGING ON THE MOVE

What constitutes mobile messaging? Mobile messaging is electronic messaging (e-mail, fax, and electronic data) using wireless or remote access technologies for users who are at remote work sites or are traveling on business. Although about one-third of mobile messagers occasionally use fax and/or another application, mobile use of e-mail is by far the most popular mobile messaging feature.

The mobile messaging market is based on the desire or need of messaging users to access their messages even when they are not directly connected to their organizations' networks. Telecommuting and business travel initially drove the need for mobile messaging, but the development of handheld devices is making mobile messaging popular for travel as proximate as the local conference room. After-hours work also is increasing its influence on the mobile messaging market.

How large is the demand for mobile messaging? IDC estimates 73 million users worldwide will participate in mobile messaging in 2001, up from 10 million in 1996. These numbers include business users only. (The consumer demand for mobile messaging appears very small at this point.)

In the United States, 60% of all computerized business sites will have remote e-mail capabilities by the end of 1997. This is a significant improvement from the prior year. At the end of 1996, only 43% of businesses had remote e-mail

capabilities; in fact, only 50% of computerized businesses had any e-mail at all.

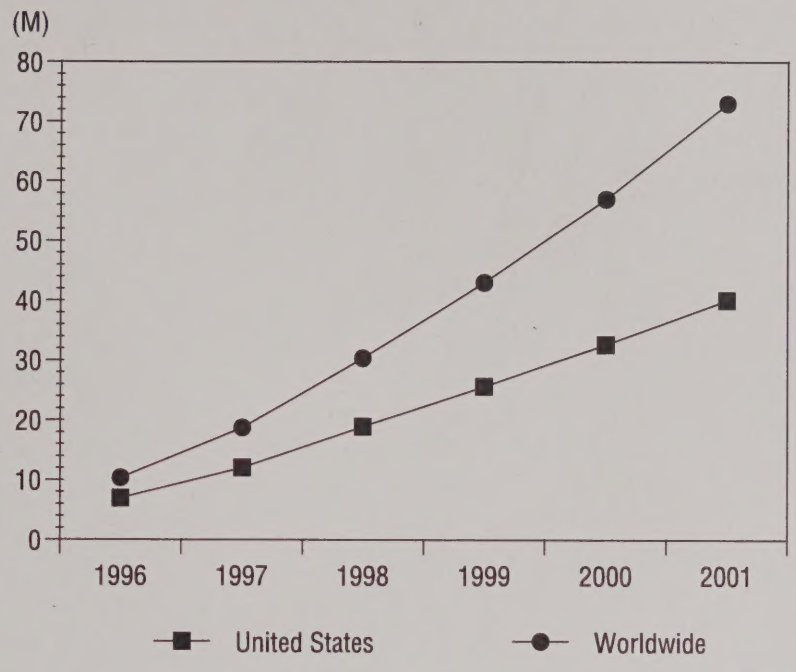
The percentage of employees making use of mobile messaging is substantial and increasing. At the start of 1997, 52% of employees at businesses equipped with e-mail used mobile e-mail functions to some degree of frequency. By 1998, this percentage will increase to 57%.

As found in the *Mobile Messaging Survey,* most mobile messagers prefer to access their messages through portable PCs. Desktop PCs established for the purpose of mobile messaging (e.g., in a home office) also are used frequently. Smart handheld devices have not attracted the attention of a large portion of mobile messagers, apparently because the installed base of these devices is still low. (IDC expects these devices to become very popular for the purpose of mobile messaging in the near term.)

Also slow to catch on is wireless messaging. Wireless messaging remains a practice of only the messaging elite. A mere 1% of employees in organizations equipped with mobile e-mail use wireless services and software to perform mobile messaging. By 1998, this percentage will increase, but only to 2% of employees.

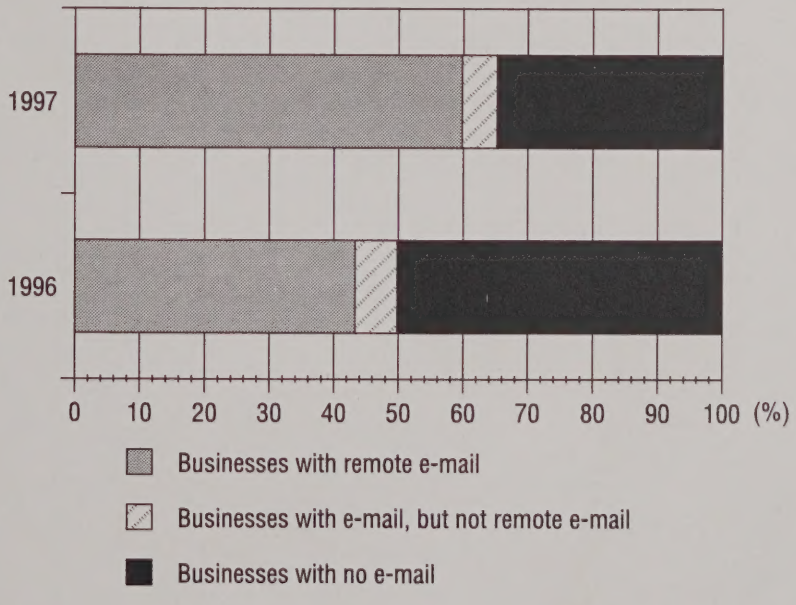
E-mail users have two choices for retrieving and sending e-mail while operating remotely. Users can dial direct to remote access servers located on-site, or they can dial in to service provider networks. These networks can be proprietary, such as General Electric's GEIS or America Online

U.S. and Worldwide Mobile E-Mail Users, 1996–2001



Source: International Data Corporation, 1997

E-Mail Capabilities of Computerized U.S. Businesses, 1996 and 1997



Source: International Data Corporation, 1997

(AOL), or they can be Internet based, such as AT&T's WorldNet.

Although it has acted as a supplemental messaging service in many instances, the Internet has not replaced a majority of existing remote services. The reason that the Internet has not replaced other remote access methods to a greater degree is likely due to the need for remote access to specific mailboxes. Many employees not only require the ability to send and receive e-mail from remote locations, but wish to do so using the mailboxes in their organization's e-mail system. Employees may prefer to remotely send and receive e-mail using Internet addresses that reflect their organizations' domains rather than addresses that reflect service provider domains. This practice enables them to present themselves through e-mail as employees, not as remote employees.

No remote access software product commands a lion's share of the remote access software market, nor does any one remote access service hold a commanding lead in the service market. However, Lotus placed three products in the top 10 in the remote access software market, and CompuServe is slightly ahead of AOL in direct dial-up services.

HELPING HANDHELDS

After initial stagnancy, the smart handheld device is enjoying strong growth. Business users are viewing smart handhelds as more than just expensive toys and are realizing the productivity value these devices offer. Depending on their type and software capabilities, smart handhelds can perform a variety of functions, ranging from recording voice notes to creating to-do lists to browsing the Internet. Because these devices are pocket sized and have a longer battery life than portables, they are proving to be practical for performing simple, application-specific functions.

IDC's *1997 Smart Handheld Devices Survey* examined how U.S. businesspeople are using their handheld devices and what they expect in future iterations of the machines.

Respondents answered questions about where they spent their time while away from their desks, thus illustrating where they would be most likely to use a smart handheld device. Nearly 58% of the time, respondents indicated they were within the building or corporate campus. An additional 23% of the time, respondents were out of the office but within a city or metropolitan area. The amount of time spent away from the office was inversely related to the distance away from the office; for example, respondents indicated less than 2% of their time was spent out of the country.

TOP 10 REMOTE ACCESS SOFTWARE APPLICATIONS AND REMOTE ACCESS SERVICES, 1996

Rank	Software	% of Respondents	Services*	% of Respondents
1	Netscape Navigator Mail	11	CompuServe	19
2	Microsoft Win95 Inbox	11	America Online (AOL)	16
3	Norton PC Anywhere	11	Direct dial-up	15
4	Lotus cc:Mail Mobile	10	Prodigy	3
5	Lotus cc:Mail Remote	9	MCI Internet	2
6	Lotus Notes	9	AT&T WorldNet	1
7	Microsoft Internet Explorer with Internet Mail Reader	8	MCI Mail	1
8	Novell GroupWise	8	IBM Global Network	1
9	QUALCOMM Eudora Pro	7	AT&T EasyLink	0
10	STAC Reachout	5	AT&T PersonaLink	0

* "Other" Internet services received mention from 27% of survey respondents.

Source: IDC's *Mobile Messaging Survey, 1996*

Probing further into the whereabouts of smart handheld users, the survey asked respondents where they did most of their work when outside their offices or away from their desks. The leading locations were company conference rooms, hotel rooms, conference rooms in other companies, and customer sites, respectively.

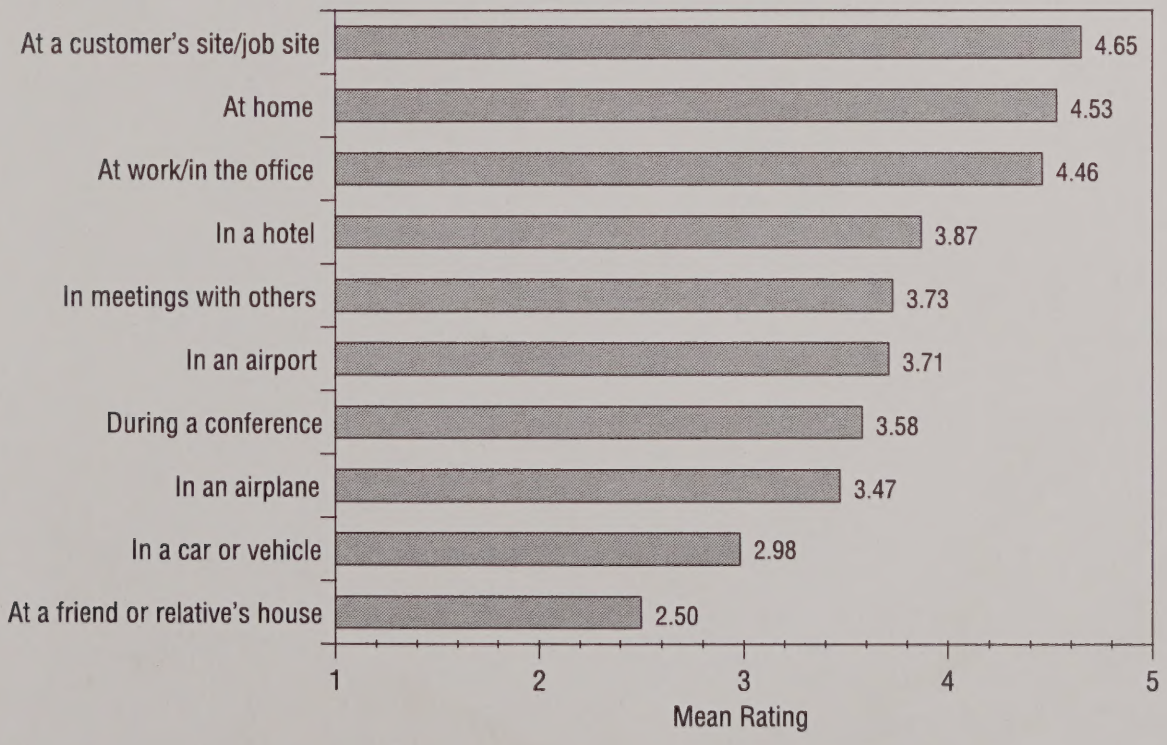
The survey asked respondents (on a scale from 1 to 5, 5 being greatest) where they thought a handheld device would be most useful. Respondents expected smart handheld devices to be most useful at a customer's site (4.65) and rated at home (4.53) and in the office (4.46) very highly as well. Interestingly, although respondents rated hotel rooms as the second-most-likely place to do work, they rated the hotel room a distant fourth as a useful place for a handheld, perhaps indicating that portable computers or other devices are more likely to be used for work functions in a hotel.

These patterns show that local mobile users are the primary candidates for smart handheld devices. Workers who use wireless e-mail to access and send messages while they are in a meeting away from their desks may enhance their productivity. Vendors can respond to these trends by highlighting these capabilities within their devices.

Respondents reported significant changes in the frequency that they used certain handheld devices. Two-thirds of cellular users in 1997 said they would use a cellular phone on a daily basis, up from one-half in 1996. In 1997, more than 61% of low-end organizer users said they would use a low-end organizer daily, compared with 12% in 1996. Daily use of a high-end organizer also climbed to an estimated 57% in 1997 from 4% in 1996.

Some of these dramatic jumps in usage may be attributed to a change in survey methodology: IDC surveyed only business users for 1997, compared with a mix of business users and consumer users in 1996. However, smart handheld devices are definitely developing their niche, and changes in methodology don't misstate the market's growth tremendously.

USEFULNESS OF A HANDHELD DEVICE BY MOBILE LOCATION



Source: IDC's *1997 Smart Handheld Devices Survey*

The rise in daily use for smart handheld devices stems partially from business users who intend to use the devices in the field. The increased interest in organizers indicates the time is right for PC companions and personal companions to revitalize the market. Most important, users are showing the business environment is a ripe market that has a need for handheld devices if productivity is truly improved. The success of US Robotics' PalmPilot, emerging interest in Microsoft's new Windows CE, and the established installed bases of vendors such as Hewlett-Packard and Sharp Electronics are all assisting the growth of this industry. Savvy vendors will put in place sales and support strategies that cater to the business market.

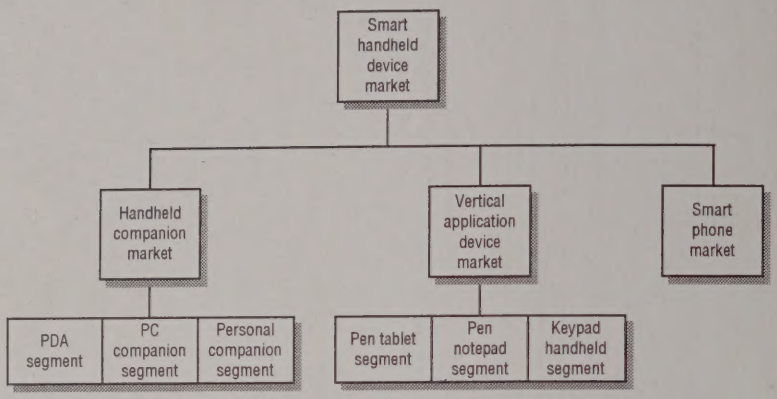
THE MARKET FOR SMART HANDHELDS

The overall market for smart handheld devices encompasses a variety of products. The accompanying figure describes the IDC taxonomy for the different smart handheld devices.

What are the differences in the three categories of smart handheld devices as defined by IDC? Their characteristics are defined as follows:

- **Handheld companions** are the devices most often categorized as personal digital assistants (PDAs), PC companions, and the emerging personal companions. Characteristics of this category include the use of these devices as supplements to desktop or portable PCs. Applications often used on these devices include personal information managers (PIMs), data collection, and light data-creation capabilities such as word processing for memos.
- **Vertical application devices** are primarily pen or keypad based and are used with specific vertical applications in a variety of industries. Examples include route delivery data collection for a vendor in the transportation industry or physician access to patient records in a hospital.
- **The smart phone** is the emerging category of enhanced "superportable" cellular phones that enable both voice and data communications. Aside from devices consisting of cellular voice communications, these phones have the ability to access the Internet and store light calendaring and Rolodex data such as names, addresses, and phone numbers. In addition, smart phones will generate a new breed of software developers as vendors either work with existing handheld operating system providers or use proprietary operating systems. The OS providers in turn will supply software development kits to developers for application creation. IDC excludes the emerging deskside screen phones from the smart phone segment.

IDC SMART HANDHELD DEVICE SEGMENTATION



Source: International Data Corporation, 1997

How large are the markets for these devices? The 2001 smart handheld market will amount to $17.5 billion, up from $4.8 billion in 1997. The U.S. share of revenue in 2001 will be more than $6 billion.

By segment, the handheld companion market will be the largest in terms of revenue in 2001, garnering $7.6 billion. It will surpass the smart phone segment's $5.8 billion and the vertical application device segment's $4.1 billion. These market sizes indicate a change in the type of demand for smart handheld devices. In 1997, vertical application devices will garner the lion's share of revenue, accounting for more than $2.1 billion; handheld companions will trail ever so slightly with a little less than

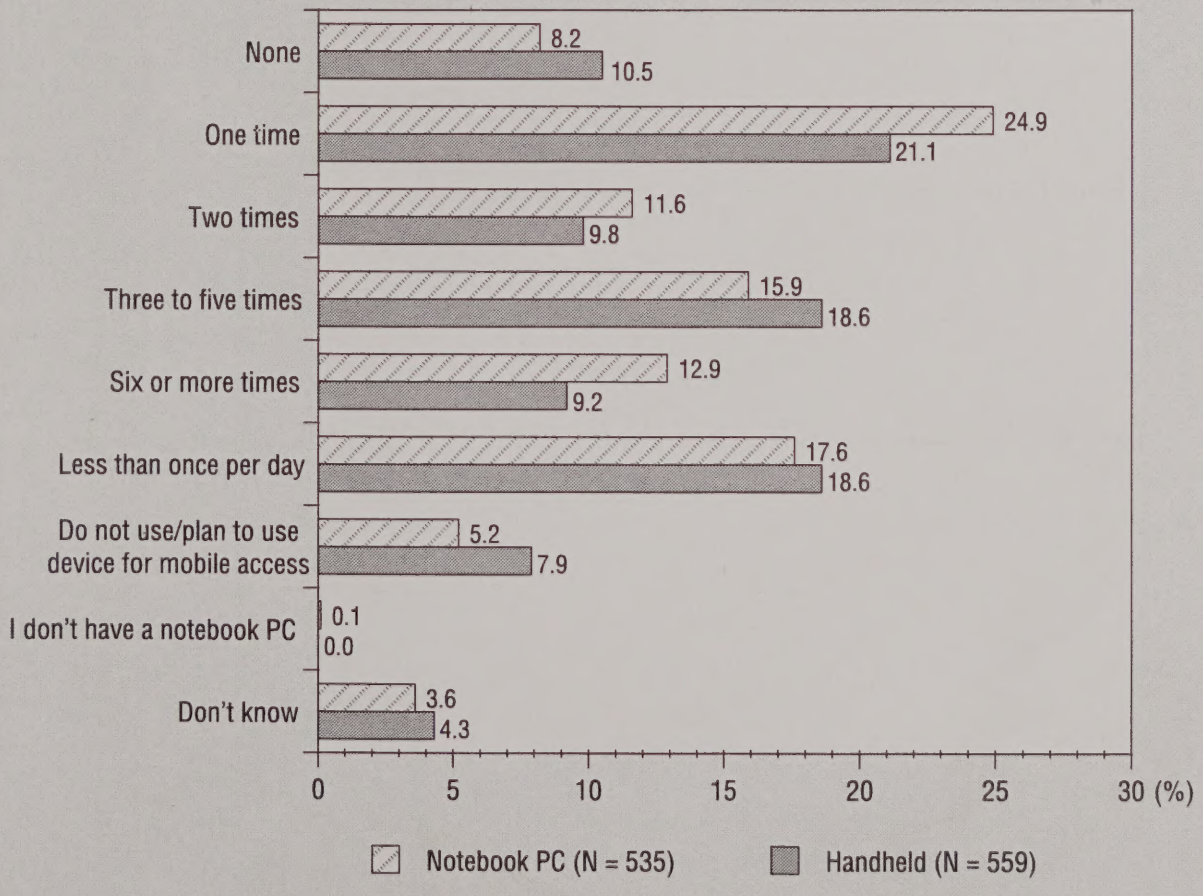
THE E-MAIL CONNECTION

IDC's *1997 Smart Handheld Devices Survey* investigated acceptance of e-mail and how respondents' use of e-mail pertained to use of smart handheld devices. Overall, nearly 73% of respondents said they used e-mail on a daily basis while mobile. In 1996, less than 30% of respondents used remote e-mail on a daily basis. This year, only about 13% said they never used e-mail when mobile.

The only significant difference in findings between the two surveys profiled in this issue of *The Gray Sheet* — the *1997 Smart Handheld Devices Survey* and the *Mobile Messaging Survey* — is the acceptance of the smart handheld as a mobile messaging platform. Only about 5% of *Mobile Messaging Survey* respondents indicated they used a device other than a notebook or remote desktop to access remote e-mail. This leaves little room for smart handheld acceptance. However, compared with notebooks and desktop computers, the penetration of smart handheld devices is still relatively small.

Perhaps more indicative of the smart handheld's role in remote e-mail functions are the findings from the *1997 Smart Handheld Devices Survey.* Because all respondents in this survey use (or are planning to use in the short term) handheld devices, the low penetration of these machines does not affect the findings. Owners of notebook PCs and owners of smart handhelds were asked how frequently they would use each device to gain connectivity to e-mail. In most usage increments, smart handheld use for remote e-mail functions was almost equal to that of portable PCs; in some cases, it exceeded portable PC use.

MOBILE WORKERS USING HANDHELDS OR NOTEBOOK PCS TO CONNECT TO E-MAIL BY FREQUENCY OF USE PER DAY



Source: IDC's *1997 Smart Handheld Devices Survey*

$2.1 billion. The smart phone category is still in its nascent stages in 1997 and will account for about $585 million — but it will grow quickly.

The revenue dominance of the handheld companion segment in 2001 will be achieved by brute volume: Its average system value will trail that of both smart phones and vertical application devices. The average handheld companion will cost $495 in 2001; smart phones and vertical application devices will cost on average $654 and $1,437, respectively.

Despite somewhat inauspicious beginnings, the worldwide smart handheld devices market will grow from 5.5 million units in 1997 to nearly 28 million units in 2001. Overall worldwide shipment growth in the smart handheld device market from 1996 to 2001 amounts to 55% per annum. The United States trails this growth rate, increasing 54% year on year; the Asia/Pacific region shows the highest regional growth at 100% per annum.

Who Are the Competitors?

With so many different product segments, many vendors can claim a leading share of their respective segments of the smart handheld market.

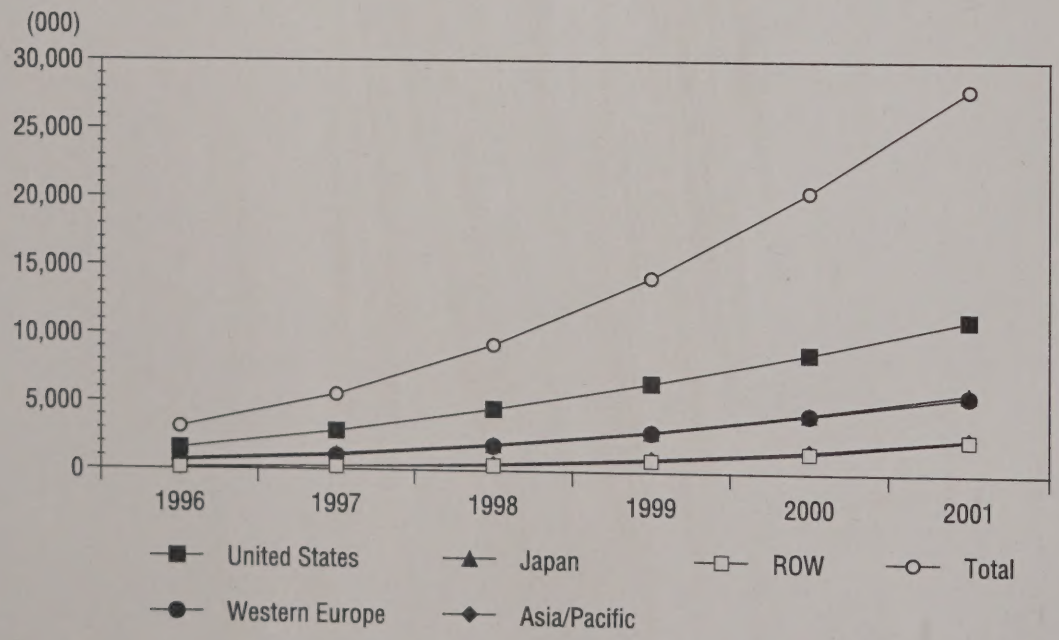
For handheld companions, Sharp holds commanding worldwide shares of PDAs and PC companions at 83% and 47%, respectively. Interestingly, Apple still is strong in the U.S. PDA market with 64%.

Nokia dominates the near-vacant worldwide smart phone market with 85% of shipments. L.G. Electronics holds the remaining 15%.

Several companies enjoy market leads in the various vertical application device segments. Fujitsu Personal Systems Inc. dominates the U.S. pen tablet segment (46%) and holds a strong lead in the same segment on a worldwide basis (28%).

In the worldwide pen tablet market, Fujitsu Personal Systems (a U.S. Fujitsu company) holds a six-point lead over its cousin by takeover, Fujitsu/ICL (Europe). Symbol Technologies dominates the U.S. pen notepad segment (48%) and — by default — the worldwide segment because the pen notepad market is primarily a U.S.-only business. In the keypad handheld segment, Symbol shares the spotlight with Telxon. Symbol leads worldwide with 34%, followed by Telxon with 29%. In the United States, however, Telxon leads with 30%, just ahead of Symbol with 29%.

Worldwide Shipments of Smart Handheld Devices by Region, 1996–2001



Source: International Data Corporation, 1997

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Computer Industry Report

THE GRAY SHEET

Global market intelligence on the information technology industry since 1964.

Home PC Vendors: Smile for the Digital Camera

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July 15, 1997
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Vol. 32, No. 9

The personal computer continues to gain acceptance among the American public as a device that can bring utility and entertainment to the home, but its popularity has not run rampant. Although its penetration has increased from less than 25% of U.S. homes at the onset of the 1990s to about 40% of U.S. homes today, the digital camera has not enjoyed the rapid adoption that some of its home electronics cousins have.

When one compares the acceptance of a popular consumer electronics product such as the VCR with that of the home PC, PC adoption appears almost sluggish. What causes this disparity when the PC offers so much more functionality?

Pundits have spent much of the past 12 months postulating why American and worldwide consumers have not opened their arms (and wallets) to the PC. Originally, many in the IT industry thought PC prices must fall to spur mass acceptance. To date, although PCs remain more expensive than VCRs and most other consumer appliances, prices have fallen. Despite this, consumers remain leery. IDC research indicates that cost may not be the big issue.

The average price consumers paid for PCs did not fluctuate much from 1995 to 1996, remaining at about $1,900, even though the average price of PCs on the market declined for that period and continues to decline. (Compaq recently released a PC for $799.)

The average annual income of computer households actually has increased in recent years. This proves that although average sales prices for PCs are declining, lesser-income households are not taking advantage of the technology. Why not?

Apparently the mass market just does not have the demand. The number-one reason (indicated by 43% of respondents) consumers did not plan to purchase a computer in 1996 was because they did not have a need for one in the home, according to the *1996 Home Media Consumer Survey*.

IDC International Data Corporation ■ 5 Speen Street, Framingham, MA 01701 ■ (508) 872-8200

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Associate Editor
Rick Miller

Production
IDC Publications

Editorial Advisers
Donald C. Bellomy, Doug McLeod
Lloyd Cohen, John Gantz
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Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573,
Oxon Hill, MD 20750-0573

■

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Vendors will have to reach the 60% of households without PCs to ensure continued double-digit growth in the industry, and they will do this by giving these households a reason to buy. Industry mavens must remember that the PC is a tool. People don't buy tools because they are inexpensive; people buy tools when they have a need for them. Enter the digital camera.

The digital camera is a good example of a PC application that the common man can relate to. The United States is a visual culture and spent an estimated $24 billion dollars on photography equipment and film in 1996 according to *U.S. Industry Profiles.**

* *Includes consumer and professional products*

The digital camera offers everyday users — not just professionals — the opportunity to manipulate images and perform high-tech functions with their photos. It also eliminates film and development costs. Are these features enough to persuade 60 million households to rush to their favorite electronics store and buy the latest digital camera and an accompanying PC? Probably not, but the digital camera joins the Internet and multimedia applications as another stimulant to the obdurate home PC industry.

This issue of *The Gray Sheet* examines the state of the fledgling digital camera market and the factors that will affect its growth, with market data excerpted from a forthcoming joint study by IDC and Future Image.

THE DIGITAL CAMERA DEVELOPS

PHASE ONE

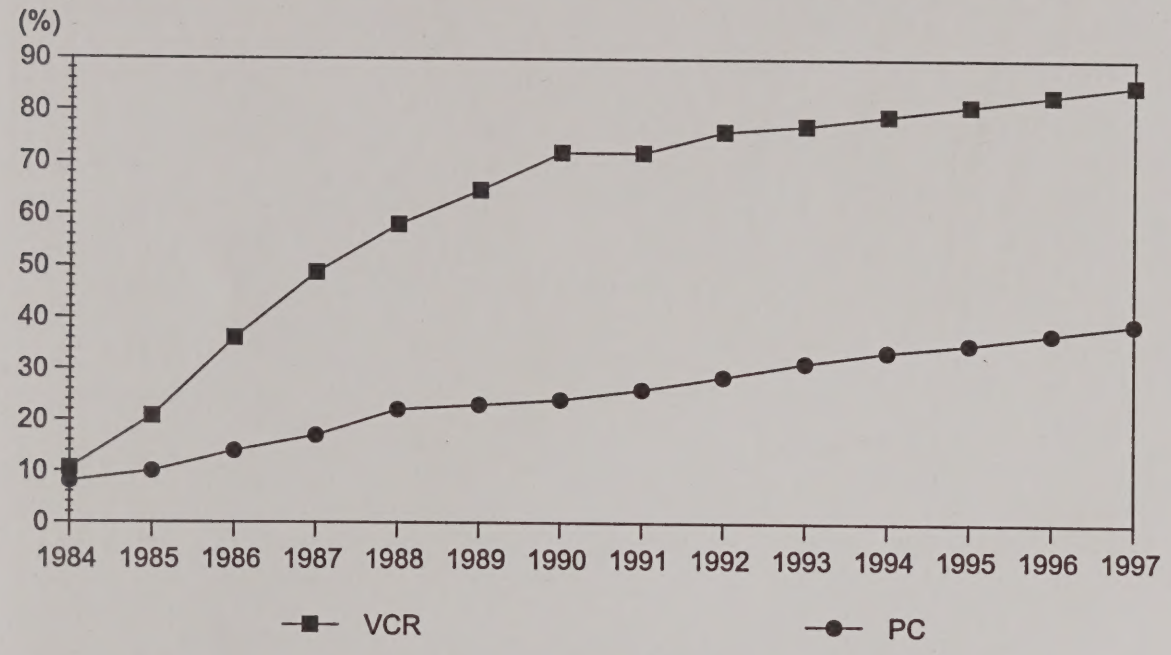
From its modest beginnings of only three models in 1991 (one each from Dycam, Kodak, and Sony), the digital camera market has dramatically expanded in scope and range during the past six years. Currently it includes hundreds of models ranging in price from $99 to $45,000 and capturing anywhere from 77,000 to 49 million pixels per exposure.

The first development phase of the market, from 1992 to 1995, was characterized by the driving role of the professional publishing segment. During that time, the digital camera market almost entirely consisted of high-end units sold into the graphic arts industry. Early adopters were professional studio photographers in catalog houses. These market segments were then, and are now, driven by film replacement applications, with growth fueled by users making two important discoveries.

First, users learned that the image quality delivered by high-end digital cameras was better than that of film cameras for unbiased color reproduction and shadow detail. Professional film typically has a film "bias" and only a maximum 3 f-stop film latitude. High-end digital cameras have a latitude with as much as 8 f-stops.

Second, despite their high cost (in the tens of thousands of dollars), these cameras could pay for themselves rapidly in

HOUSEHOLD PENETRATION: THE PC VS. THE VCR, 1984–1997



Source: International Data Corporation, 1997

film costs, processing and scanning costs, time savings, and gains in competitive edge. Sales of these types of cameras were driven by the return on investment.

PHASE TWO

The second development phase of the digital camera market occurred from 1995 to 1997. This second stage was driven by sales to desktop publishers and computer-literate individuals in vertical applications and personal settings.

In order to control the high product prices that stemmed from the exorbitant cost of sensors and low-volume manufacturing, vendors were compelled to make stringent performance trade-offs, which resulted in image quality vastly inferior to even the least expensive film cameras. For that reason, market growth at the entry level was not driven by traditional photographic applications, but by the emergence of two computer-based imaging applications with substantially lower image-quality requirements.

The first application is document-centric imaging, which is the inclusion of photographs in documents ranging from leaflets to presentations, from newsletters to birthday cards. Document-centric imaging is essentially an extension of desktop publishing enabled by the emergence of a solution approach with low-cost, near-photo-quality color printing.

The second application is soft-display applications, or online imaging, in which the image is not intended to be printed and is only viewed on a computer screen. This primarily includes photo e-mail and the use of photographs in Web pages, which arose through the emergence of widespread PC access to the worldwide telecommunications infrastructure.

PHASE THREE

The third phase of the digital camera market is just beginning. In this stage, economies of scale will lead to lower development costs and, therefore, lower prices. Increased acceptance among consumers will drive the digital camera market to 8 million units by 2001. The digital camera market will develop beyond the early adopter stage.

In the near term, consumers will continue to trade off image quality, pitting the usability of images against camera price. In the long term, users will be able to assume image quality is suitable for their needs and pay for

the camera features they want for their type of usage.

Applications for the Digital Camera

If the digital camera is to be compelling enough to make people buy PCs in order to take advantage of it, what's so special about the digital camera that will make people want to buy the camera?

One major attribute of the digital camera is its return on investment. The cost of film is eliminated — as is the cost of film development. Professionals discovered this early in the development of the digital camera market, and amateurs and hobbyists are now recognizing this benefit.

A second benefit of digital photography is the ease with which the pictures can be applied to Web-based applications and other forms of electronic communication. Digital photo files are easily transplanted into Web pages or attached to e-mail. The latter application may spur some sales of digital cameras and PCs to families with college-aged children because the increased availability of PCs to college students will make the transfer of digital photos a viable and instantaneous form of communication.

Digital photography adds a deeper element of creativity to desktop publishing applications. Digital photos are easy to manipulate through the use of various desktop painting and graphic arts programs. Professional photographers can alter images for advertising and presentation purposes, and consumers and hobbyists can make their own alterations for fun.

The digital medium offers form-factor enhancements that would never have been possible with traditional cameras. Early this year, Minolta released a digital camera with a zoom lens on a rotating mount, which lets users shoot from varying angles without contorting themselves. The lens can be attached to a one-meter cable that can be snaked into positions and areas that no traditional camera ever could.

Many digital cameras offer LCD monitors so users can view their shots instantly and delete those that don't meet their requirements, saving storage space for subsequent photos. Storage space is another advantage over traditional cameras. Some cameras offer storage for up to 100 images, depending on the resolution quality of the photos. (Good digital cameras have adjustable resolutions.)

Peripherals vendors also are making the adoption of digital cameras attractive to users. Epson, Hewlett-Packard, and Alps Electric all recently introduced inkjet printers designed for photographic output — and at inexpensive prices.

Digital Camera Market Size

In the forthcoming report *Digital Camera Market Forecast and Analysis, 1996–2001* (IDC #13856), IDC presents several scenarios for sizing the digital camera market. For the purpose of this newsletter, we consider a scenario that eliminates the lowest model camera (the computer "eye" model) before the completion of the forecast period. We do this because we believe that although computer eyes still will be purchased, they will not be used for the express purpose of digital photography.

Given the above stipulation, the worldwide digital camera market will grow from $866 million in 1996 to more than $4 billion in 2001. The year-over-year growth for this period will be 37%.

The U.S. market for digital cameras will grow only slightly slower than the worldwide market, with year-on-year revenue growth of 32% during the same period. Of the $4 billion spent worldwide on digital cameras in 2001, the United States' share will be $1.5 billion. Shipments will grow from nearly 800,000 in 1996 to 3 million in 2001.

From a worldwide and U.S. perspective, the average selling price for digital cameras will remain about the same throughout the forecast period, hovering around $500.

Digital cameras will have the greatest impact on the home segment of the market in the United States. Nearly 52% of the U.S. digital camera sales were attributed to home purchases in 1996. The 400,000 digital cameras shipped to U.S. consumers constitutes roughly one-fourth of the worldwide shipment total in 1996, adding fuel to the theory that the digital camera market will affect and be affected by events in the consumer PC industry.

WORLDWIDE DIGITAL CAMERA REVENUES, 1996–2001

Source: International Data Corporation and Future Image, 1997

WORLDWIDE DIGITAL CAMERA UNIT SHIPMENTS, 1996–2001

Source: International Data Corporation and Future Image, 1997

The government/education segment of the U.S. digital camera market was the second-largest market segment, accounting for about 15% of digital cameras sold.

Market Enablers and Inhibitors

The digital camera market will be influenced by factors generic to the PC industry on the whole and factors specific to the digital imaging industry. The declining price of PCs combined with the increasing functionality of digital photography equipment will yield a "sweet spot," or parity, at which potential PC buyers who have an interest in digital photography will be coaxed into investing in a PC because of the availability of quality digital imaging equipment.

The continuing advances in PC storage, the development of user-friendly interfaces, and the declining price of PC components are making PCs more and more affordable.

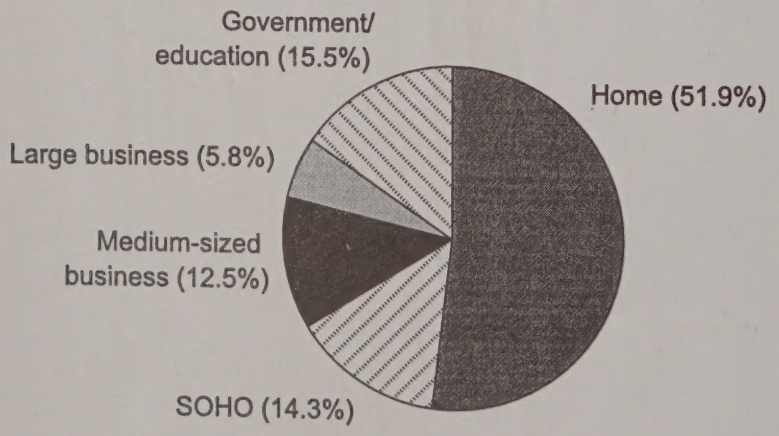
Numerous issues remain in the way of making digital photography truly simple and foolproof for nontechnical users. Until now, these issues have related primarily to system-level problems such as media and interface standards, appearance matching, and interapplication communication. Recent announcements of alliances among industry giants — in particular Intel/Kodak and Intel/Microsoft as well as Microsoft/TWAIN Working Committee — demonstrate that digital imaging is now on the radar of the key players. The objective of these alliances is to eliminate system-level obstacles to digital imaging and to use digital cameras as a driver to help sell PCs.

A prime example of this objective is Microsoft's decision to support TWAIN 1.7 within the control panel of future versions of the Windows OS (see *The Scanner Drive War: Will TWAIN KO ISIS? The 1997 AIIM Conference*, IDC #13536, May 1997). TWAIN is the interface standard for open communication among peripherals.

Factors internal to the digital camera industry will influence mass adoption as much as the general trends affecting the cost of PCs.

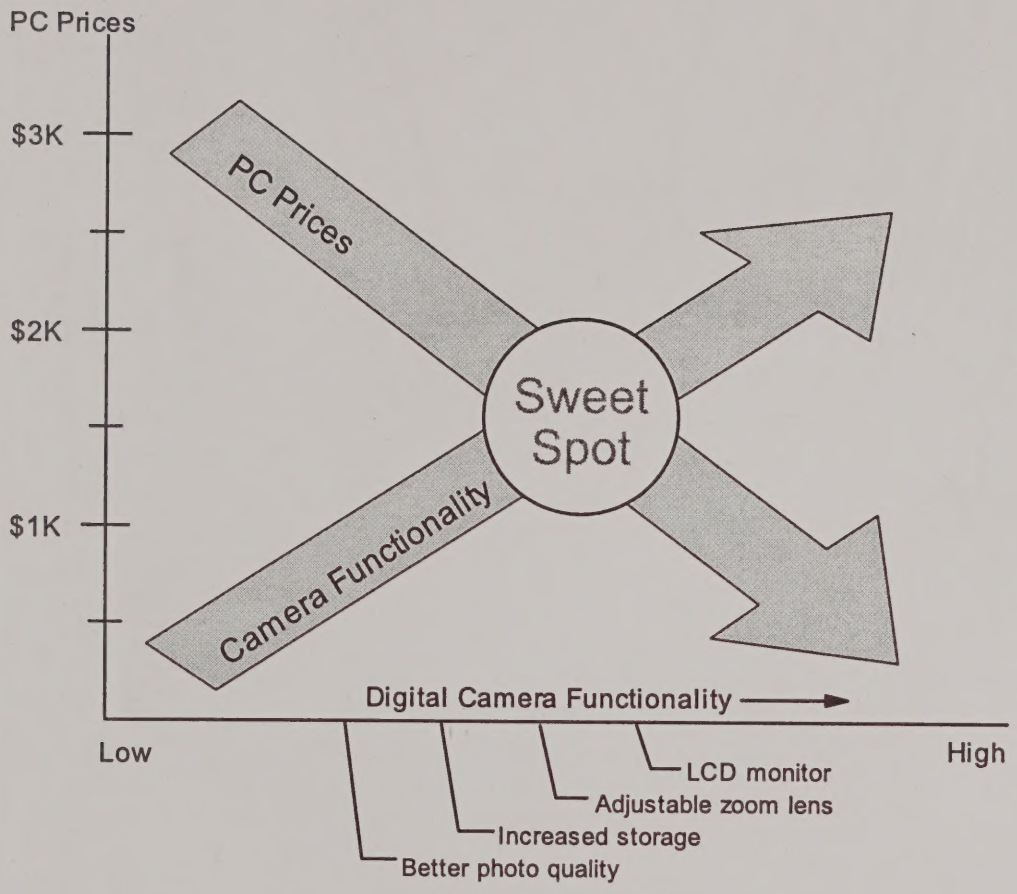
One key internal enabler is the removal of a major constraint that has shaped the market since its origins: high sensor costs. In 1997, dramatically broadened economies of scale, amortization of sunken engineering costs, and the simplified conversion of DRAM manufacturing plants in Ireland, Korea, and Taiwan to CMOS manufacturing sites will allow the cost of area array sensors to fall. The dramatically lower prices promised by proponents of CMOS sensors combined with the lure of potentially huge markets are convincing vendors to take a risk in this market. Although costs per pixel are not yet decreasing uniformly across the range of sensor sizes, there

U.S. Digital Camera Unit Shipments by User Segment, 1996



Total = 786,801 units
Source: International Data Corporation and Future Image, 1997

When Will Consumers Buy Digital Cameras?



When will the photo buffs go digital? When declining PC prices meet increaing digital camera functionality to produce a digital imaging system price parity.

Source: International Data Corporation, 1997

is no question as to which direction they are headed.

Another internal enabler is advanced chipsets, such as those introduced by Motorola and LSI Logic, that have allowed digital camera functionality and control, memory, compression, microprocessing, CCD sensor, LCD control, audio, video out, on-screen display control, and more on one chip. This consolidation, along with a digital camera operating system, could further enhance controls and preprocessing, which should enhance user experience and ease of use. Advanced chipsets will bring the overall costs of digital cameras down. Vendors with products that have these chipsets can tailor functionality to meet specific user needs to a targeted market simply by adding to or subtracting from the chipset configuration.

TYPES OF DIGITAL CAMERAS

The definition of the digital camera is not constrained to the pocket-sized point-and-shoot consumer device that stores its photos in memory until downloaded to a PC. The breadth of digital camera products is subdivided into seven main segments based on criteria that combine imaging performance, camera features, and customer usage. These segments are defined by the following:

- **Computer "eye."** These are tethered devices that give PCs — usually desktop systems — the capability to capture digital still and motion images and to transmit live video in digital form. They contain no storage and offer few controls. Spatial resolution is 640 × 480 or lower. Computer eye cameras will cease to function as digital cameras in 1999 because of the decreasing costs of feature-rich mobile cameras. Computer eyes will find use as teleconferencing appliances.
- **Soft display class mobile cameras.** These mobile (untethered) cameras feature spatial resolution in the 240 × 320 range, making them primarily suitable for soft-display-based applications. They offer a limited set of camera features.
- **Basic point-and-shoot mobile cameras.** These units offer spatial resolution in the VGA range with the vast majority of models pegged at 640 × 480. They deliver a limited set of camera features, typically offering only one or two among the following: fixed or zoom lens, autofocus, autoflash, internal flash memory or removable storage, color LCD screen.
- **Photo quality point-and-shoot mobile cameras.** Products in this category provide the closest possible approximation of 35mm film image quality at mass-market prices. Their feature sets tend to be similar to those found in premium models of film-based point-and-shoot cameras, with the addition of digital-specific features like LCD screens and advanced chipsets. Units currently on the market have resolution specifications ranging from 0.8 to 1.5MP (million pixels).
- **Digital imaging assistants (DIAs).** This category is just beginning to emerge in 1997. It consists of products that combine basic image acquisition (e.g., camera) capabilities with PDA functionality. Products will come from two convergent technology directions: on the one hand, cameras that have the added capability of running software applications and, on the other hand, PDAs that have the added capability of capturing images.
- **Professional class mobile cameras.** These cameras are intended to replace 35mm film cameras in professional news and documentation gathering applications with low to moderate output quality requirements. They feature interchangeable lenses, standard high-end camera bodies, and professional controls. Spatial resolution is typically around 1.5MP.
- **Prepress and portrait class professional digital cameras.** This category consists of costly, very high-resolution cameras used in professional "images for profit" settings. Models are organized in three subgroups: mobile prepress/portrait class cameras, tethered prepress class cameras, and tethered portrait class cameras.

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Computer Industry Report

THE GRAY SHEET

Global market intelligence on the information technology industry since 1964.

Service, Please! Despite One Slow Segment, Worldwide IT Services Thrive

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July 1, 1997
IDC #13889
Vol. 32, No. 8

By nature, the worldwide IT services market is nebulous and hard to quantify. IT consulting blends with business consulting; system integration blends with network integration; and many large outsourcing projects contain elements of any or all of the aforementioned.

Despite the hazy demarcations among its segments, the services market accounts for nearly one-third of the worldwide IT market — a far greater share than that held by multiuser systems or packaged software — and its share will drop only slightly by the turn of the century.

Growth in the aggregate worldwide services market is forecast to progress at a stable 9% for the next five years, and this growth is sandbagged by an anticipated decline in the hardware maintenance and support market (-1% growth). Most segments of the services market will offer double-digit year-on-year expansion.

Although some services have passed their heydays, systems integration, network consulting and integration, network operational services, and business process outsourcing are enjoying strong increasing demand. But they don't always exist symbiotically, and cannibalism among these service segments indicates decision makers' changing perspectives on the role of IT in their organizations.

Even though a significant share (73%) of top executives consider IT to be an important strategic advantage in their respective marketplaces, typical IS functions are no longer considered so strategic that they must be kept under lock and key and implemented and maintained by an in-house IS group. In the United States, top executives favorably regard outsourcing to focus on core business objectives, and the U.S. business culture is growing to accept outsourcing of entire projects and business functions.*

* Note: Information sourced from IDC's *1997 Global IT Survey*.

IDC International Data Corporation ■ 5 Speen Street, Framingham, MA 01701 ■ (508) 872-8200

THE GRAY SHEET
Associate Editor
Rick Miller

Production
IDC Publications

Editorial Advisers
Donald C. Bellomy, Doug McLeod
Lloyd Cohen, John Gantz
David Vellante, Gigi Wang
Bruce Stephen, Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573,
Oxon Hill, MD 20750-0573

■

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Outsourcing directly affects the distinct service groups. When analyzed according to IDC's services taxonomy, outsourcing detracts from the growth of the individual service segments. The outsourced function becomes the responsibility of the outsourcer; thus it is no longer considered in the market for the distinct service contractors.

However, overall outsourcing aside, the individual service markets are growing nicely. What distinct services segments stand out for their strong growth?

- Systems integration
- Discrete IT consulting
- Network consulting and implementation
- Network operational services
- IT training
- Business process outsourcing
- Desktop management

This issue of *The Gray Sheet* will examine the role these services play in the worldwide and U.S. IT markets, and it will investigate the factors prompting or inhibiting their growth.

WHAT MAKES THE SERVICES MARKET?

IDC derives the total U.S. IT services market from the accompanying demand-side macroeconomic model. Other regional markets throughout the world are derived from similar versions of this model. The demand-side spending derived from this model is grouped into five activities and 12 discrete IT services. Supply-side data is collected from vendors to determine strategic directions in the respective markets and to provide comparison materials for the demand-side data.

The service segments subsequently detailed in this newsletter are segments that show double-digit growth.

SYSTEMS INTEGRATION

The systems integration market, one of the largest of the 12 services segments in raw revenue size, is forecast to grow 11% incrementally worldwide, 1996–2001, and 12% incrementally in the United States for the same period. This service segment will account for $60 billion of the worldwide IT market in 2001.

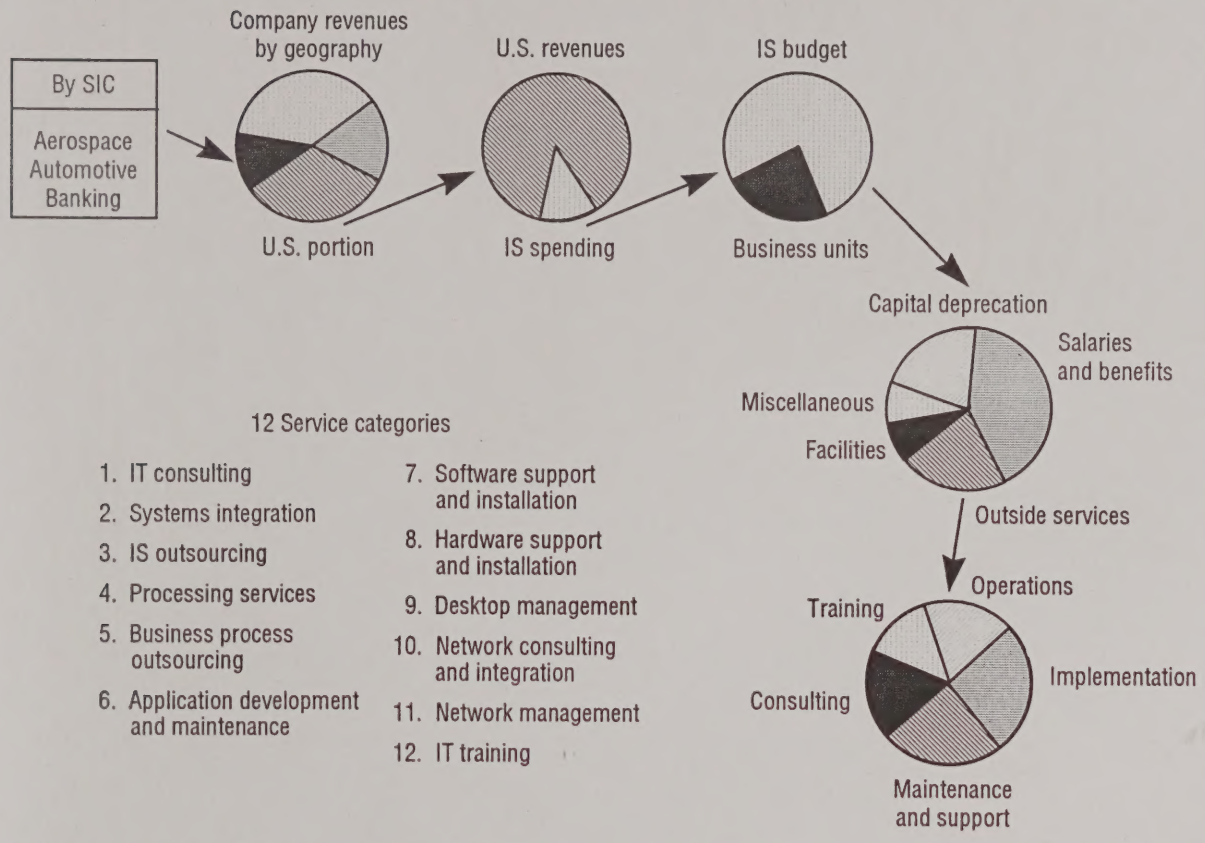
The systems integration market, one of the largest of the 12 services segments in raw revenue size, will account for $60 billion of the worldwide IT market in 2001.

Systems integration is defined as the sum total of activities that lead to the following:

- Integration of complex systems of different platforms and technologies as well as integration of enterprise packaged software
- Building and delivering an entire system to specifications, involving a fair amount of custom services, including consulting, application development, integration, and customization of packaged applications

The end result of these activities is the delivery of a project that meets a business objective

SERVICES MARKET DEMAND-SIDE SPENDING MODEL



Source: International Data Corporation, 1997

and fulfills some predetermined systems specifications.

IDC does not include in its forecasts systems integration and systems development work that is performed in-house by IS departments. It also does not include any systems integration activities that may be done within outsourcing deals; only systems integration work sold as projects to professional service providers is included.

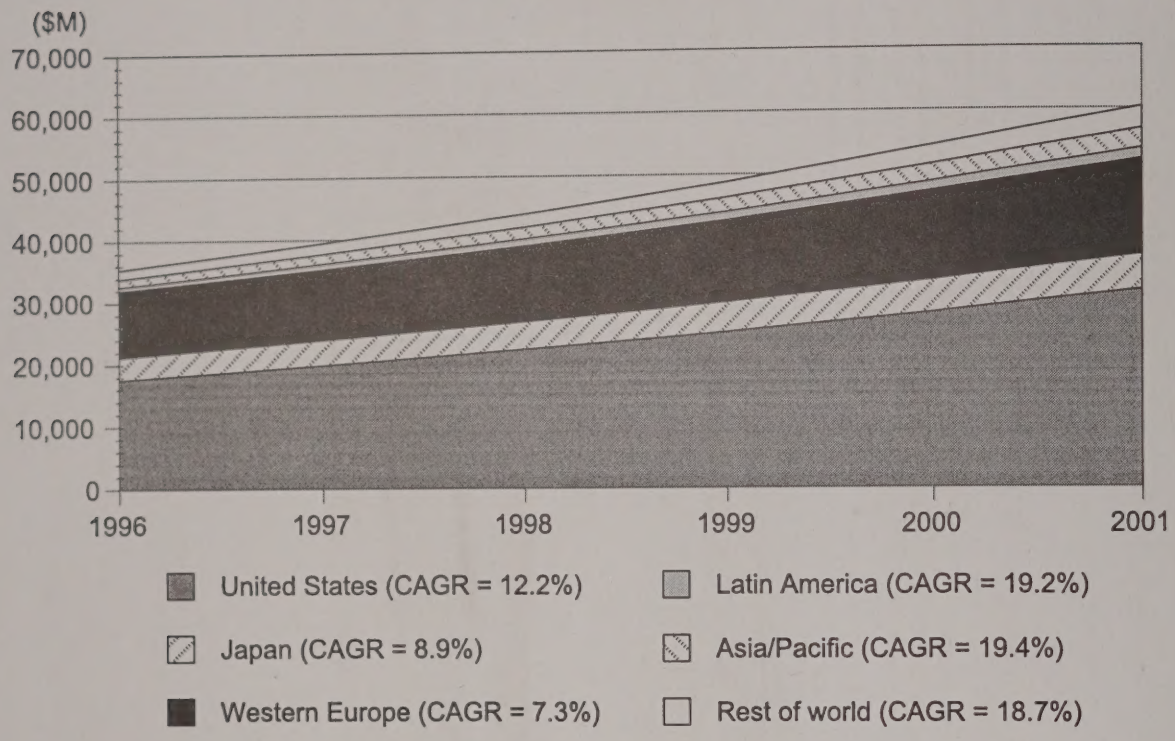
The greatest opportunity for systems integrators is in the United States, and despite the strong growth found in developing regions such as Asia/Pacific and Latin America, the greatest opportunity remains in the United States through the end of the forecast period. The United States accounted for slightly less than 50% of 1996's $35 billion market and will account for 52% of 2001's $60 billion.

The greatest opportunity for systems integrators is in the United States, and despite the strong growth found in developing regions such as Asia/Pacific and Latin America, the greatest opportunity remains in the United States through the end of the forecast period.

The large size and strong growth of the U.S. systems integration market has fostered the growth of U.S. systems integrators: the top-10 vendors worldwide are U.S. companies. U.S. systems integrators have reaped the benefits of their home market, thus enabling them to expand and globalize; consequently, they are encroaching on the turf of foreign vendors. In Western Europe and Japan, respectively the second- and third-largest systems integration markets, local systems integrators have elected to defend their home markets and forsake globalization. Their revenue growth has suffered accordingly when compared with their aggressive U.S. competitors.

What is driving the bountiful U.S. market and fostering the

WORLDWIDE SYSTEMS INTEGRATION SERVICES REVENUES BY REGION, 1996–2001



Source: International Data Corporation, 1997

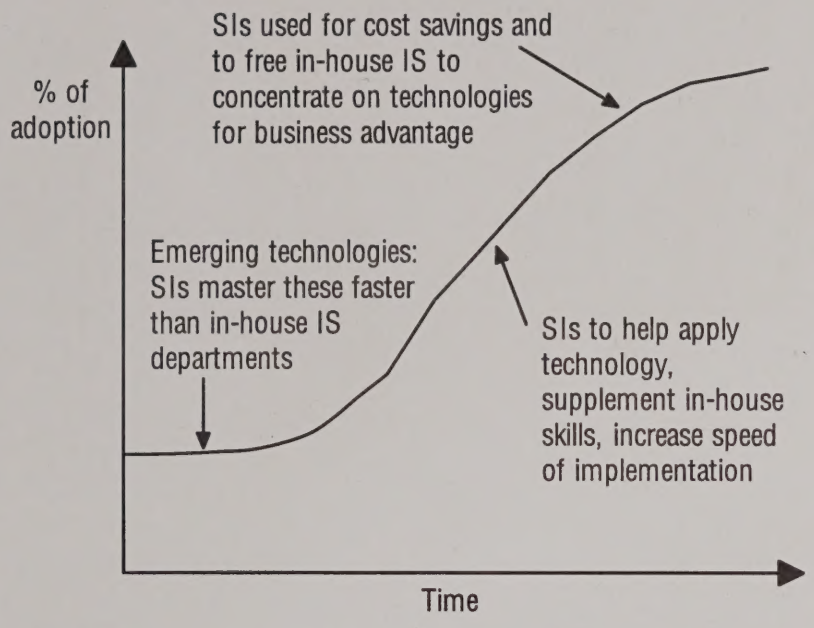
success of U.S. systems integrators? The answer lies in the changing role of IT in the business process. No longer must IT implementation *follow* a company's business strategy; in most cases, IT strategies now are part of the overall corporate strategy. On a scale from one to five (five being the greatest), top executives rated the likelihood of IT to be aligned with corporate strategy; they gave it a score of four (according to IDC's *1997 Global IT Survey*).

The Internet embodies one example of IT's changing role in strategy development. The ability of companies to get close to their customers, suppliers, and partners through the use of the Internet is unparalleled in history. In contrast to earlier years when reengineering to enhance efficiency and reduce costs was a major thrust of companies seeking to respond to changes, the trend now is toward using reengineering and the associated systems development to increase revenue and strengthen relationships with customers. Systems development in the customer care and service arena is an area of rapid and accelerated growth.

Consistently decreasing technology life cycles also are driving the need for newer systems. Often in-house IS departments are not the most qualified to develop the most appropriate systems. In the initial stages of a technology life cycle, companies look to systems integrators to help them evaluate and apply the technology for building systems. Systems integrators typically master emerging technologies earlier than in-house IS departments because it is their livelihood to do so.

As the technology matures, more in-house IS personnel get up to speed with the technology. However, demand for systems integrators does not lessen because companies still need help to apply the technology to the business. Moreover, companies know that they need to build the system as fast as possible to get a return on investment before the business environment changes and the next wave of technologies arises to render the system obsolete.

USE OF EXTERNAL SYSTEMS INTEGRATORS AND THE TECHNOLOGY LIFE CYCLE


% of adoption
SIs used for cost savings and to free in-house IS to concentrate on technologies for business advantage
Emerging technologies: SIs master these faster than in-house IS departments
SIs to help apply technology, supplement in-house skills, increase speed of implementation
Time

Source: International Data Corporation, 1997

Finally, as the technology matures, systems integrators are demanded to help companies maintain and prolong the lives of their legacy systems while freeing up in-house IS personnel to concentrate on technologies for business advantage.

Also contributing to the success of the U.S. systems integration market is the willingness of U.S. companies to leverage outside experience. European and Japanese businesses are less likely to relinquish the control and confidentiality of their IS functions.

Two factors are limiting the U.S. systems integration market: the year 2000 problem and the rise of outsourcing. As 2000 approaches, many companies are diverting funds that would be used for systems integration to focus on date-code renovation. As IT and business process outsourcing increases, the systems integration market loses revenue because any integration revenue from work performed under outsourcing contracts is not counted in IDC's systems integration category.

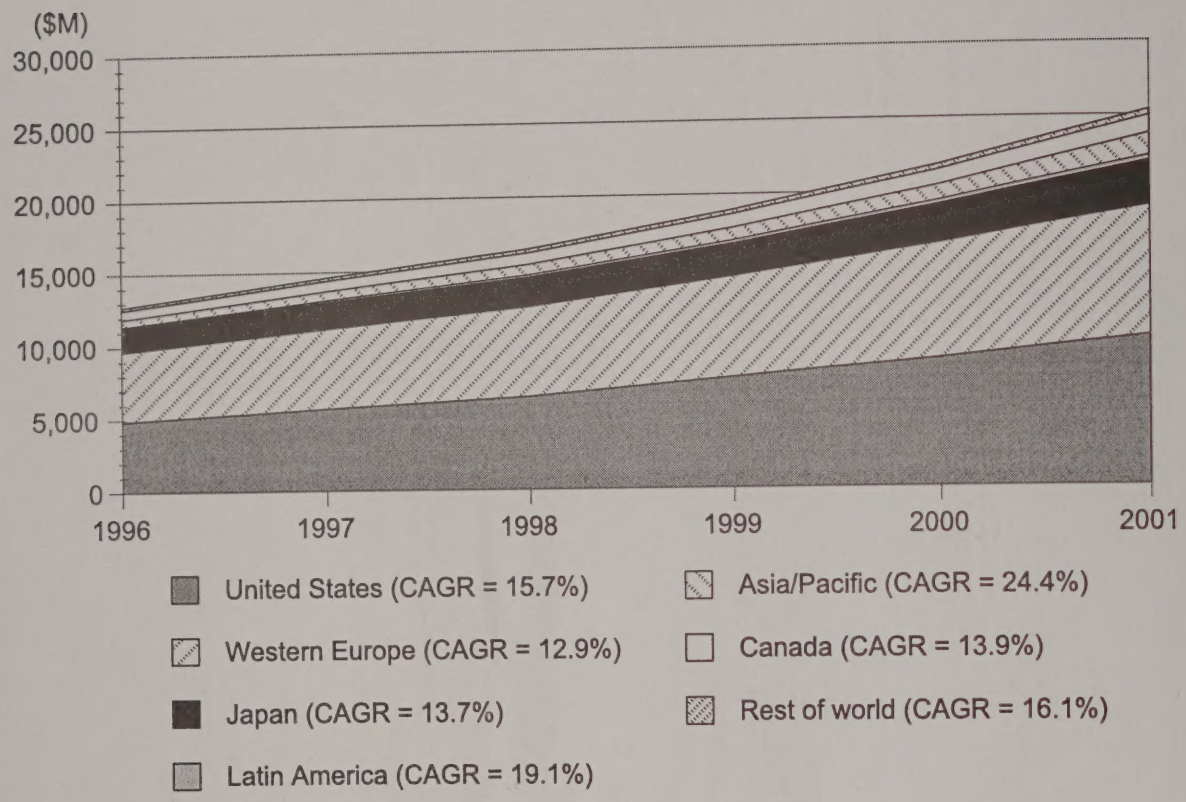
All in all, however, the inhibitors for the systems integration market are minor, and the $25 billion in added market size during the next five years make this segment the second-largest revenue generator of the IT services industry behind the large but slow-growing processing services outsourcing segment.

DISCRETE IT CONSULTING

Within the overall consulting market, which is composed of consulting activities from nearly any type of IT service, is the category of discrete IT consulting. IDC defines discrete IT consulting as consulting that is provided as a unique standalone service outside of any other type of engagement. In other words, it is not part of a systems integration or a software application and installation project.

Discrete IT consulting is exhibiting year-on-year growth of nearly 15% through 2000. In the emerging markets (Latin America and Asia/Pacific) growth rates are as high as 24%. Discrete consulting trails by less than one percentage point the growth of the overall IT consulting market (which includes discrete IT consulting and consulting that is embedded in other projects), indicating the trends for users to purchase their consulting as part of more comprehensive projects.

WORLDWIDE DISCRETE IT CONSULTING SERVICES REVENUES BY REGION, 1996–2001



Source: International Data Corporation, 1997

NETWORK CONSULTING AND INTEGRATION

Network consulting and integration is forecast to grow 16% year-on-year worldwide through 2001 to become a $20 billion market. The U.S. market for network consulting and implementation is expected to keep pace with, or slightly exceed, the worldwide growth throughout the forecast period. The U.S. network consulting and integration market will constitute 58% share of the worldwide market for the next five years.

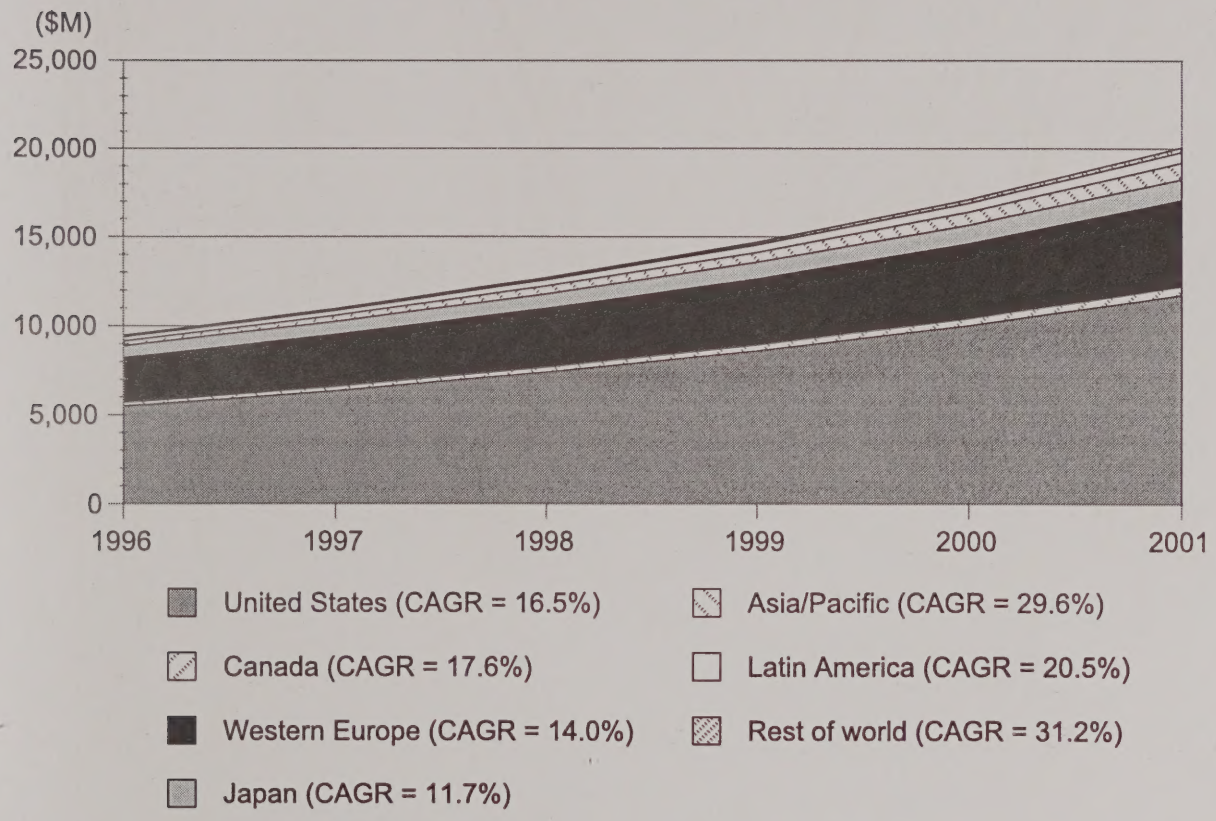
Consulting services include services such as needs assessment, network strategy and planning, network design, and so forth. Integration services include services such as site preparation, project management, installation, training, and so forth.

Several overarching issues are affecting all areas of network services. As enterprise networks and their enabling technologies continue to increase in complexity while worldwide network infrastructure buildouts continue at a rapid pace, organizations are increasingly contracting with outside providers for a wide range of engagements, including network consulting, network design, change management, implementation, tuning, management, and proactive monitoring services.

The explosion of Internet, intranet, and remote access technologies has left end users at all levels of the corporate structure demanding increased network access to greater amounts of information from variable locations. This trend has provided opportunities for services providers in a range of areas, including network planning, installation, structured cabling,

The explosion of Internet, intranet, and remote access technologies has left end users at all levels of the corporate structure demanding increased network access to greater amounts of information from variable locations.

WORLDWIDE NETWORK CONSULTING AND INTEGRATION SERVICES REVENUES BY REGION, 1996–2001



Source: International Data Corporation, 1997

access provisioning, and project management.

Network security has moved in the past year from being an afterthought of the IS manager to being a top priority of the CIO and CEO of virtually every type of organization. As a result, services for network security consulting in addition to firewall implementation and maintenance have become some of the fastest-growing service segments in the industry.

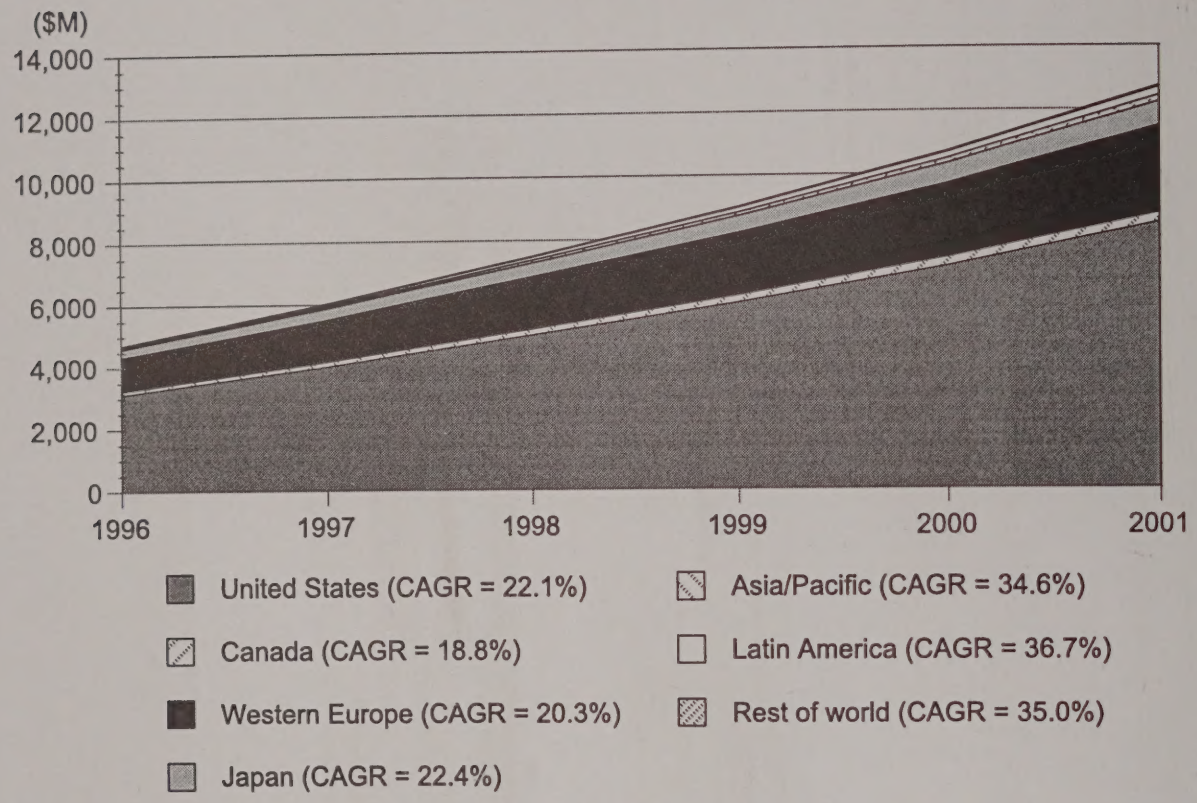
NETWORK OPERATIONS OUTSOURCING SERVICES

IS departments that are under budgetary pressures to reduce staffing and costs while providing higher network availability and throughput are increasingly finding that outside consulting, implementation, and operational services providers often present a cost-effective alternative to developing and maintaining specific types of network skills and capabilities with in-house staff and resources.

The worldwide network operations outsourcing market will exhibit 22% year-on-year growth from 1996 to 2001. Like the networking consulting and integration market, the U.S. market for network operations outsourcing will mimic worldwide growth throughout the forecast period. The U.S. share of this market will hold constant at 66%.

Network operations outsourcing comprises one of the fastest-growing outsourced segments of the services categories. A large part of this growth is because in-house customer network management costs comprise the highest proportion of the network operating budgets of many organizations. This situation presents a prime opportunity for cost shifting, whereby management costs can be offloaded to or shared with an outside provider that is able to realize significant economies of scale. Additionally, if the organization is also experiencing performance problems because of staff overload, volume of network changes, the impacts of new technology, and

WORLDWIDE NETWORK OPERATIONS OUTSOURCING REVENUES BY REGION, 1996–2001



Source: International Data Corporation, 1997

increasing demands on the network, then contracting with an external operational services provider begins to look even more appealing to overburdened IS departments.

IT TRAINING

As long as the world's IT market continues to grow, IT training is a service segment that will grow in tandem. Provided that continued IT growth is tied to continued advances in computing and like technologies, the need for skilled persons to design, develop, install, manage, or use these technologies will drive the need for IT training.

As with its other service segments, U.S. IT training will continue growth at a strong enough rate to extend the United States' market share through the forecast period. The United States held 43% of the $14.6 billion worldwide IT training market in 1996, and it will increase this share to 46% of $24.6 billion in 2001.

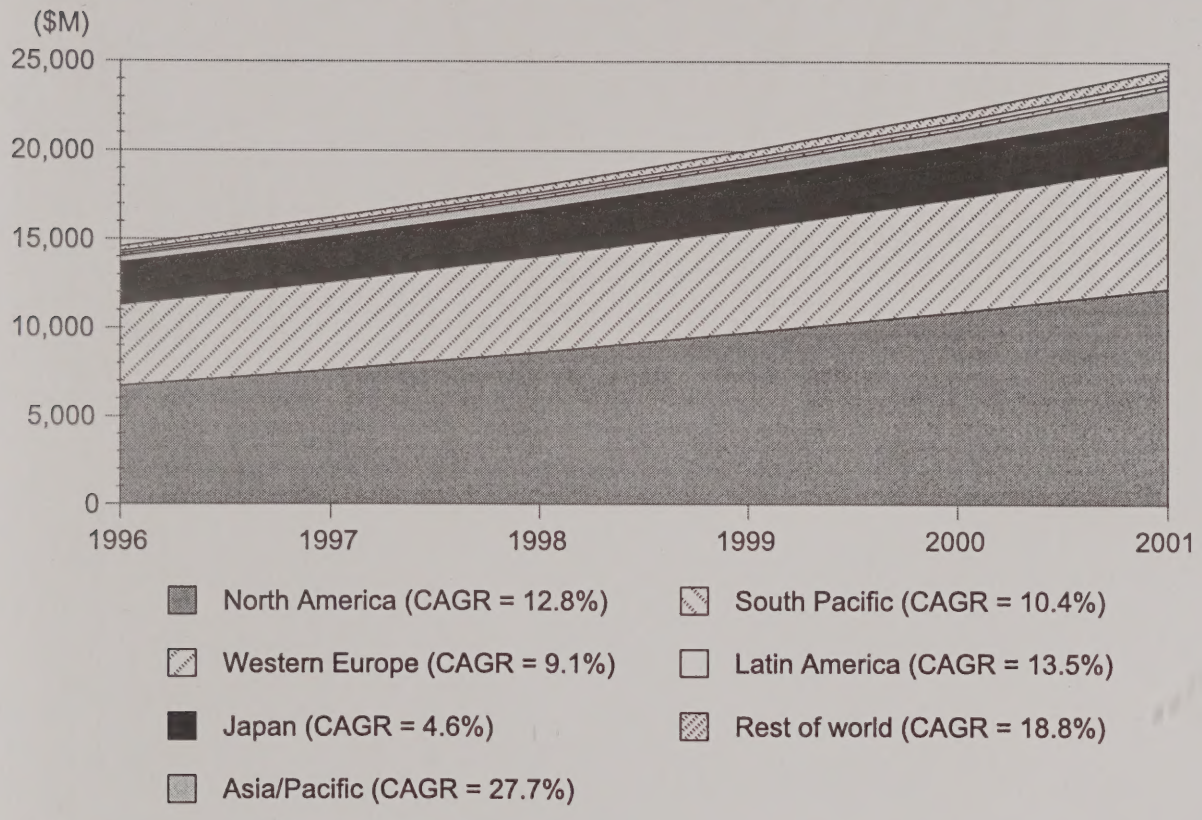
Growth in emerging markets is strong, especially in Asia/Pacific (excluding Japan). Asia/Pacific's compound annual growth from 1996 to 2001 is greater than 18%, more than 5 points stronger than the 13% U.S. growth for the same time period. Asia/Pacific will increase its worldwide share of the training market at the expense of Japan, which will drop from 15% share in 1996 to 12% in 2001.

IDC's rest-of-world category also is forecast for outstanding growth at 19% year-on-year increase in revenue through 2001.

Some of the greatest opportunities (on a percentage growth basis) in the entire IT industry can be found in various IT training delivery segments.

Technologies that drive the worldwide IT market will change throughout the forecast period, so understandably the technologies for delivering training will change as well. Some of the greatest opportuni-

WORLDWIDE IT TRAINING AND EDUCATION SERVICES REVENUES BY REGION, 1996–2001



Source: International Data Corporation, 1997

ties (on a percentage growth basis) in the entire IT industry can be found in various IT training delivery segments.

IDC classifies training delivery segments in the following three ways:

- Instructor-led seminars or classes
- Technology-based training (computer-based training, distance learning, or electronic performance support systems)
- Text-based training (books and manuals)

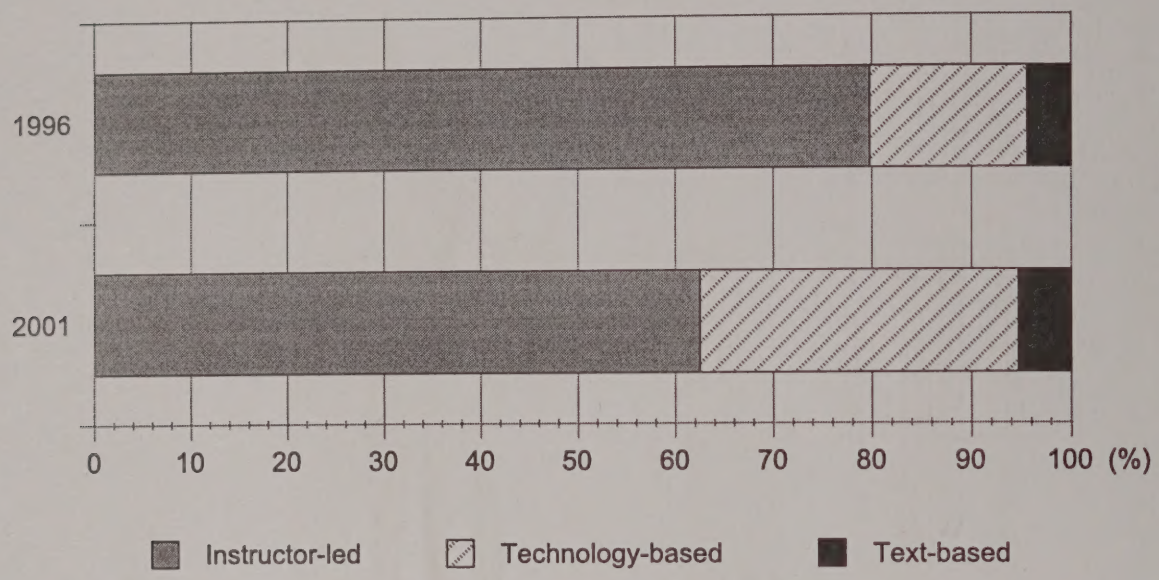
The U.S. training market is indicative of users' shifting interests in the way they consume training and how these shifting interests parallel the changes in communications technologies en masse. Although the instructor-led portion of the IT training market continues to hold the lion's share, the market gains made in the technology-based training segment cannot be denied.

The growth of technology-aided training is not limited by a lack of demand from end users but by limitations in delivery technology. IDC expects advances in speed and quality of delivery to drive demand for technology-aided products. Interestingly, instructor-led training may show strong growth if it is reformatted to deliver interactive, instantaneous training over the Internet or corporate intranets.

Although the instructor-led portion of the IT training market continues to hold the lion's share, the market gains made in the technology-based training segment cannot be denied.

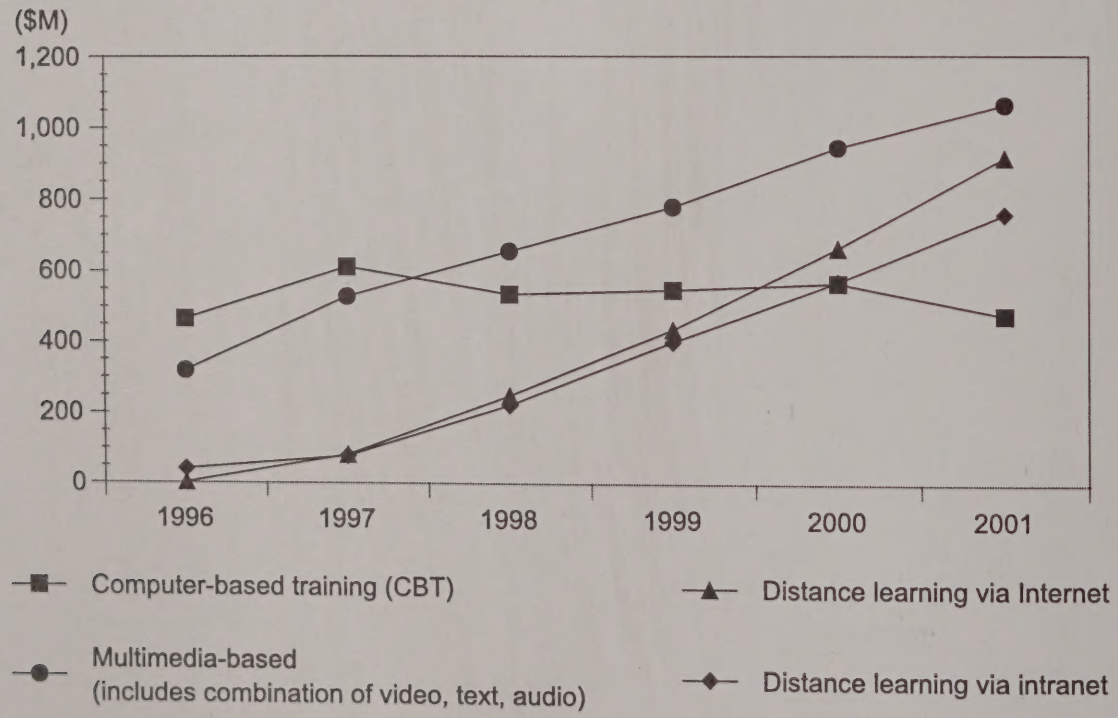
In the meantime, Web-based training primarily will consist of preproduced material, and until bandwidth becomes more plentiful, CD-ROMs and hybrid CD-ROMs (CD-ROMs with links to the Internet) will enjoy

U.S. IT Training Market by Delivery Segment, 1996 and 2001



Source: International Data Corporation, 1997

Selected U.S. Technology-Based IT Training Revenues, 1996–2001



Source: International Data Corporation, 1997

a large piece of the technology-based IT training market.

The ability to access training information 24 hours per day, 7 days per week, combined with the option of accessing only the specific material the student desires, will foster the demand for technology-based training.

Business Process Outsourcing (BPO)

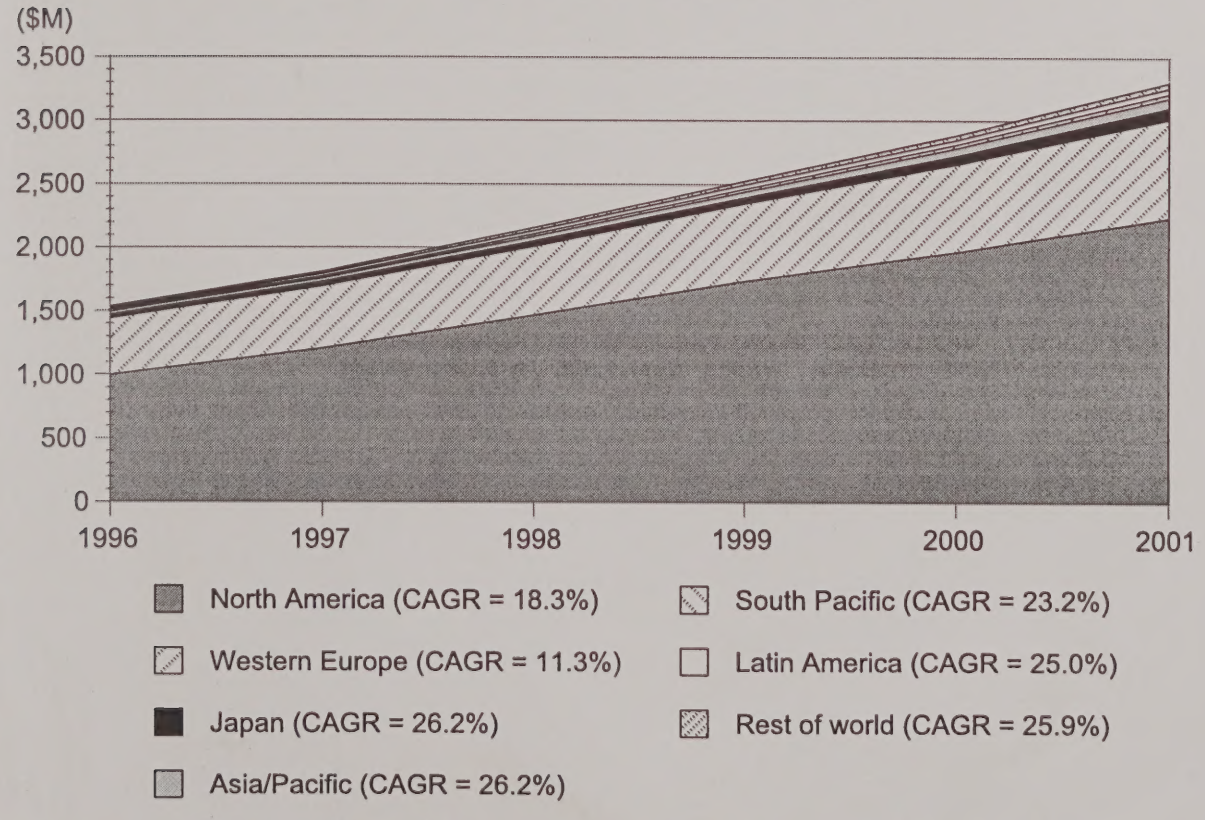
BPO services involve a specific set of activities and expertise aimed at managing a business function or process within a company. Contractual service-level agreements include responsibility for both IS and non-IS activities. This is different from IS outsourcing and processing services, whose primary metrics are tied to timeliness and the performance of the information system. Some BPO segments include administrative (billing, shareholder services, and 401K and pension plans), customer care (customer service and call centers), finance (cash management, receivables management, and accounting), and human resources (regulation compliance, benefits administration, workers' compensation, and expatriot administration).

The business process outsourcing market remains a minor market compared with most of the other services markets, but it is growing stronger than most other segments as well. The worldwide growth rate for business process outsourcing, 1996–2001, is 30%. The United States exceeds this growth rate at 36% for the same time period. The worldwide market for business process outsourcing will be more than $9 billion in 2001, up from $2.4 billion in 1996.

Desktop Management Services

As customer organizations have become increasingly aware of the true costs of owning and operating desktop hardware and software, many have turned to outside service providers to manage their desktop environ-

Worldwide Desktop Management Services Revenues by Region, 1996–2001



Source: International Data Corporation, 1997

ments. Many companies realize that by outsourcing their day-to-day desktop service and support operations, they can devote their internal resources to more pressing needs and simultaneously reduce their costs.

The worldwide market for desktop management services was $1.5 billion in 1996, and it will more than double by 2001 — growing by 16.9% annually. True to form in the services market, North America, dominated by the United States, will continue to hold the largest share of the desktop management services segment.

IDC sees spending on desktop management services as growing rapidly through 2001 as more companies outsource desktop services, including PC maintenance, software upgrades, help desk services, asset management, and others. The leading providers of these services are IBM, Hewlett-Packard, Digital, Vanstar, Entex, and EDS. The field is crowded with competitors including large services organizations, resellers that are building their services businesses, traditional outsourcing vendors, and traditional hardware maintenance firms.

IDC currently defines and sizes this market based on discrete desktop management contracts. If one includes spending on desktop management services provided under larger outsourcing or network management deals, the market is roughly two to three times larger than IDC's current sizing. Leading providers such as EDS and IBM are providing desktop management services as part of huge outsourcing contracts. In many cases, the actual delivery of the desktop management services is subcontracted by these firms to another provider.

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Global market intelligence on the information technology industry since 1964.

The Worldwide PC Outlook: New Factors Change Forms

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June 15, 1997

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The worldwide PC market continues to exhibit healthy growth, but the motives that have driven customers to buy are changing the form of the products.

As more consumers and business users alike embrace the freedom and functionality that the PC affords, these attributes are changing what buyers want in a machine — and the traditional desktop PC is no longer the consummate supplement for consumer wants.

The PC first gained its popularity through its autonomy. No longer did users have to be connected to a large, expensive mainframe to conduct computing functions — memory and processing ability were contained at the site of input and output. PC users could set up shop at any location with a power source. With the advent of networking and client/servers, users had the best of both worlds: the ability to work independently but to share work collaboratively.

The same benefits — mobility and connectivity — are pushing new trends in the PC market. Portable PCs offer virtually unlimited mobility, and in a competing market NCs (network computers) offer complete connectivity at purportedly less cost to operate than their PC cousins.

Will portables and NCs cause a steady decline into obscurity for the desktop PC? Absolutely not, but, in most regions of the world, portables and NCs will begin to accumulate increasing share of the world's computing market. In 2001, portables will constitute about one-fifth of all PCs sold, and the ratio of all PCs sold to NCs will be 3:1. (It's 30:1 at present.)

However, although the desktop PC may sacrifice some share to portables or NCs, two important factors indicate growth for the PC market as a whole. First, portables still count in the overall PC market, and although some portables will cannibalize sales from the desktop sector, many portable sales will be incremental shipments for the PC market in general. Second, although the NC market is growing by leaps and bounds, more of this growth will come

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Associate Editor
Rick Miller

Production
IDC Publications

Editorial Advisers
Donald C. Bellomy, Doug McLeod
Lloyd Cohen, John Gantz
David Vellante, Gigi Wang
Bruce Stephen, Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573,
Oxon Hill, MD 20750-0573

■

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at the expense of the dying terminals market than at the expense of PCs.

Many of the drivers of the portable PC market and NC market sectors are common to the PC market as a whole. This issue of *The Gray Sheet* will examine these drivers and the regions in which PC growth is strong. Examples of drivers include the following:

- The Internet, a subject that crops up repeatedly in the pages of *The Gray Sheet,* is a definite driver of the PC market on the whole and arguably the biggest driver for the NC market.
- Windows 95 drove PC sales in 1996; the new "toys" for 1997 will be digital cameras and 3D graphics capabilities.
- Asia/Pacific has developed as a market and as a source of new PC vendors; it represents increased opportunity and increased competition.

PCs ON THE WHOLE

The worldwide PC market cooled somewhat in 1996, but growth will remain strong. The fastest-growing markets center on emerging regions. IDC continues to highlight Asia/Pacific (excluding Japan) as the emerging area that shows the most unit and dollar growth through 2001. Latin America, currently a little less than one-third the size of Asia/Pacific (excluding Japan), is expected to post a 1997–2001 CAGR that is slightly higher than Asia/Pacific (excluding Japan).

The 68.8 million PCs shipped in 1996 were distributed among the following regions: the United States (26.5 million units), Western Europe (16.3 million units), Asia/Pacific (excluding Japan — 8.9 million units), and Japan (8.2 million units). The rest-of-world category (including Latin America, Canada, Eastern Europe, and the Middle East) claimed the remaining 9 million PCs shipped.

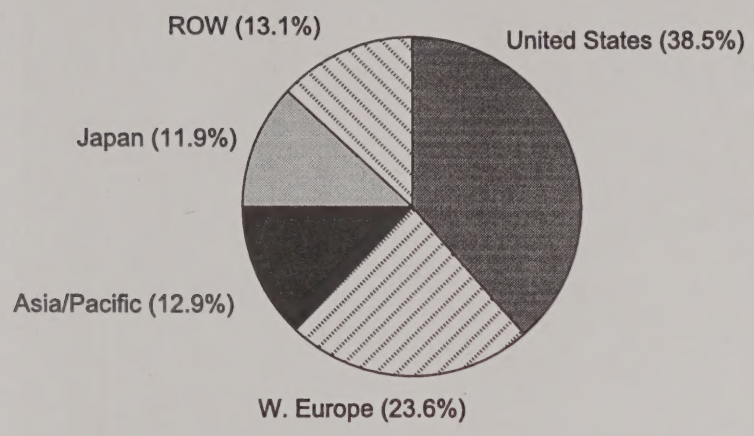
Note: All numbers in this document may not be exact due to rounding.

The worldwide PC unit shipment total rose 17.1% in 1996 versus 25% in 1995, marking the first year since 1991 that sales did not increase by at least 20%. The fourth quarter was especially weak worldwide, growing only 11%, mainly because of depressed sales in Europe. U.S. demand, which represents 38.5% of global PC consumption, held up relatively well, with volume rising 15% following 1995's excellent pace of 23.2%. The U.S. retail market, however, weakened during the all-important fourth-quarter buying season.

Asia/Pacific (excluding Japan) and Japan led worldwide PC growth. Together, these markets provided a net addition of 4.2 million units, or nearly 42% of the total increase of 10 million units in the worldwide PC market. Another key contributor was Latin America; this segment of IDC's rest-of-world category reported 19.6% growth, which surpassed the worldwide rate of 17.1%.

The importance of Asia/Pacific (excluding Japan) will continue to broaden. With its 1997–2001 shipment CAGR of 20.3%, the region will grow much faster

WORLDWIDE PC SHIPMENT SHARE BY REGION, 1996



Total shipped = 68.8 million units
Source: International Data Corporation, 1997

than other markets. The lion's share of this growth is rooted in China. With its economic engine humming, the PRC PC market is expected to reach more than 8.3 million units by 2001, making it the third-largest country market behind the United States and Japan.

By 2001, the sizes of the Western Europe and Asia/Pacific markets are forecast to be almost identical, each with 18% of worldwide PC volume. After 2001, Asia/Pacific will likely surpass Western Europe in size.

Relative to its worldwide market share of 23.6%, Western Europe contributed the least of any region in 1996. Western Europe unit volume increased only 7.1%, which represented fewer than 750,000 additional PCs. Although the notebook and PC server markets in Europe showed good growth, the desktop market increased 5.5% because of a weak performance in the consumer desktop sector. The German PC market, third largest in the world, contracted significantly in the fourth quarter of 1996, sinking under the wave of record unemployment levels.

In short, the emerging economies are growing rapidly while the United States and Western Europe are slowing; however, the critical mass of the established markets is large enough for them to maintain regional share positions through the forecast period.

Overall, 1997 is shaping up to be a richer technological year than 1996. In addition, the market for entry-level products is gaining momentum. This should help open demand. On a geographic basis, Western Europe is expected to bounce back a bit, but Japan's growth will continue to moderate. The United States is expected to grow at almost the same rate as 1996, and Asia/Pacific (excluding Japan) will continue its rapid expansion. ROW will also show a market increase identical to last year.

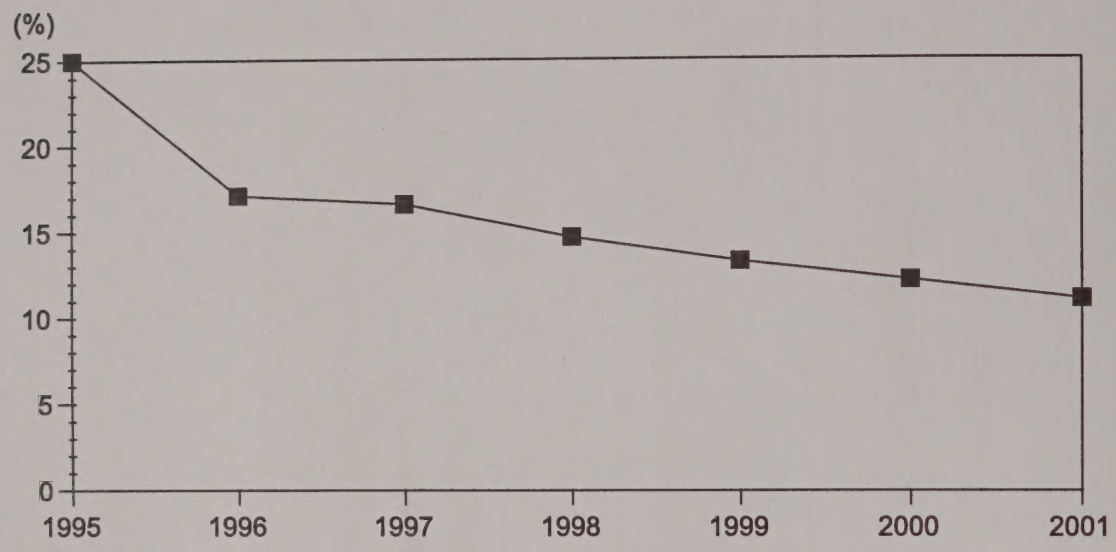
PC MARKET DRIVERS AND INHIBITORS

A variety of issues contributed to the growth of the worldwide PC market in 1996. These issues included the following:

- Increased interest in the Internet
- Adoption of Windows 95 and applications
- Fiercer competition as Asian vendors entered and/or expanded their position in the United States and Asia/Pacific (excluding Japan)
- Continued strong demand for portable computers led by a big year in the United States
- Growing interest from the home and small office segments in international markets
- Continued economization of key PC technologies, including fifth-generation CPUs, color TFT displays, multimedia features, hard drives, and DRAM
- Continued adoption of local area networks (LANs), which benefited shipment volumes of PC servers and commercial desktops
- Accelerated vendor interest and availability of lower-cost consumer and commercial desktops
- Increased end-user interest in Windows NT, which led to a focus on desktop-hardware upgrades

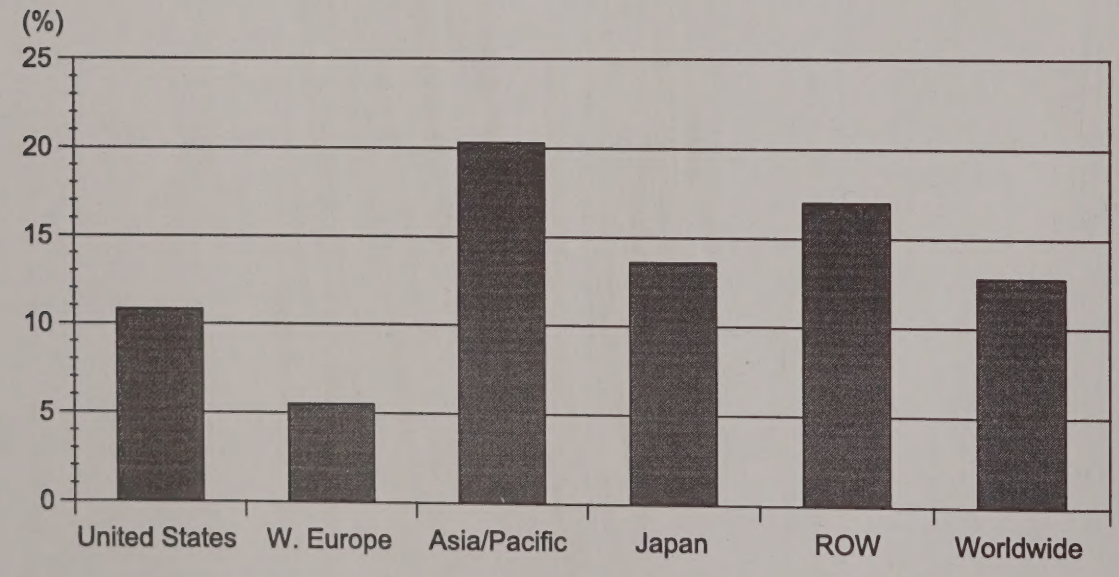
In 1997, most of these drivers will continue to affect the PC market, and new advances in technology will complement growth even further. The

WORLDWIDE PC SHIPMENT GROWTH RATE, 1995–2001



Source: International Data Corporation, 1997

WORLDWIDE PC SHIPMENT GROWTH RATE BY REGION, 1997–2001



Source: International Data Corporation, 1997

following technologies will play a role in increasing the worldwide demand for PCs:

- Intel, AMD, and Cyrix will release MMX processors to further spur demand for multimedia.
- DVD will have a slow rollout but could provide a market kicker by yearend.
- Digital cameras will be a hot peripheral for businesses and the home.
- 3D graphics will be available by yearend.
- The decrease in cost for TFT panels will improve and provide speed to the already fast-growing portables category.
- Desktop management software will make it easier for corporate administrators to manage machines, spurring more business demand.

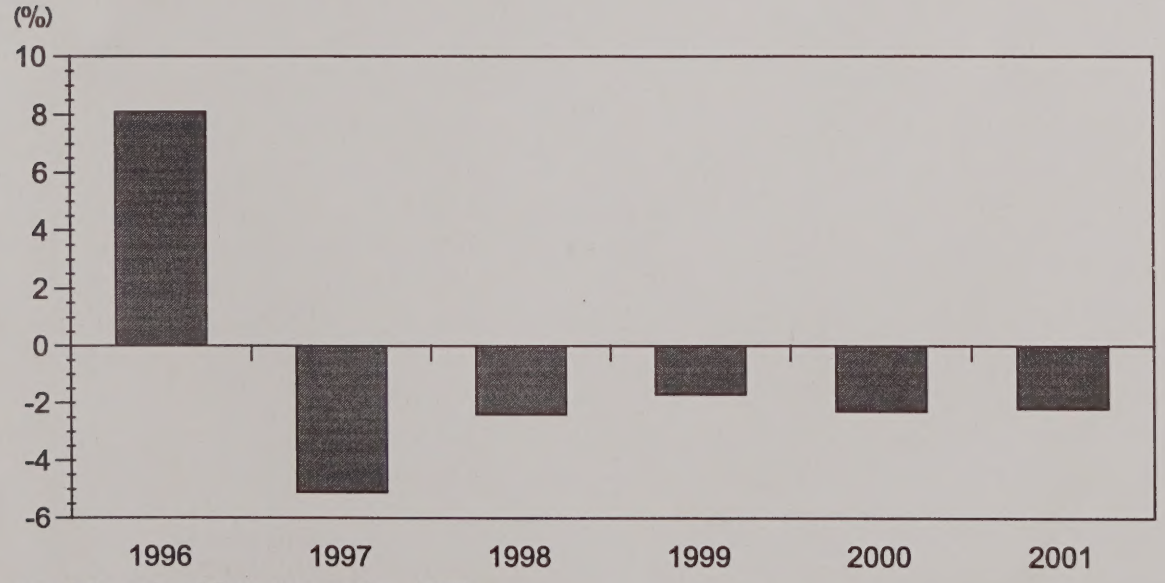
Several critical issues, ranging from economic slowdowns to product release schedules, could impede the growth of the worldwide PC market as well. These issues include the following:

- The bleak economic situation in Western Europe and Japan
- Portable computer market oversupply
- Moderation in the U.S. home market
- Commercial buyer uncertainty given the large number of transitions currently in place — Windows operating systems, microprocessors, desktop management tools, and issues related to total cost of ownership
- Postponement of Windows NT 5.0 and Windows 9X (the major upgrade to Windows 95) shipment until 1998
- The degree to which new low-cost PCs can fuel market expansion

The final bullet point is the most enigmatic. The increasing demand for low-cost commercial and consumer desktops and notebook PCs, although spurring sales, is reducing the rate of PC revenue growth — especially in the United States. As an increased number of consumer and commercial desktops priced less than $1,500 roll to market, and as the $1,500–3,000 notebook market expands, the overall average system value in the United States will drop significantly.

The value of the average system shipped in the world in 1997 will be 5% less than it was in 1996.

WORLDWIDE GROWTH IN AVERAGE SYSTEM VALUE, 1996–2001



Source: International Data Corporation, 1997

THE PC's CHANGING FORMS

Throughout the pending period of increasing shipments, declining prices, and changes in standard features and configurations, the form factors upon which users perform their computing will change. The portable PC and the network computer will see great interest from users in this period, and by 2001, these devices will be encroaching on the traditional desktop PC's market.

As buyers become more savvy, they will choose their computing tools depending on their specific needs. Travelers will take to portables and smart phones; large businesses and education centers will show an acceptance of NCs. Even desktop PCs themselves will come configured for performing certain functions, and features not necessary to those functions will be forsaken to keep prices low.

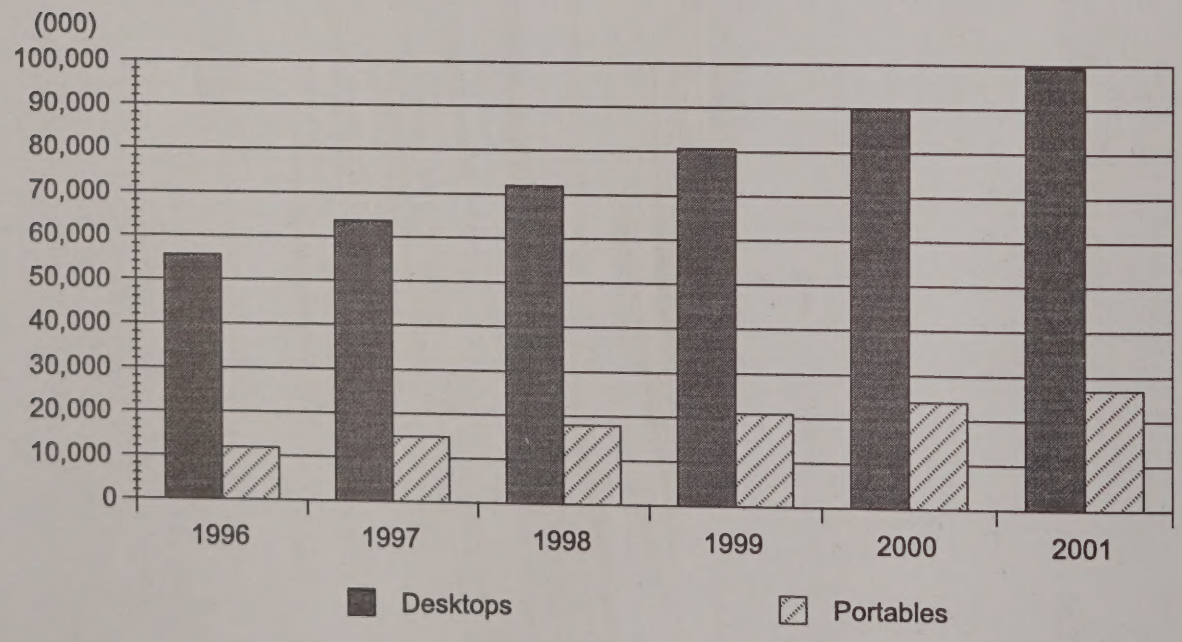
PORTABLES: CARRYING THE PC MARKET?

The portable computer market continues to be a key catalyst for worldwide PC growth. Portable PC growth is expected to exceed total PC growth through 2001. Much of this growth will stem from a strong desktop replacement market, increased use of portables as primary computing devices, and the broadening of the market to include the small business and small office/home office (SOHO) sectors.

The commitment and participation of all the top global PC and component players continue to accelerate the pace of innovation, competition, and product introduction in the marketplace. In addition, the amount of resources devoted to the mobile computing market is still increasing, as heightening competition and innovation among component, peripheral, software, network, online services, and content suppliers impact the market.

As a result of this innovation, there is a broader array of solutions in the mobile marketplace, at a full range of prices. As demand shifts from premium notebooks to value notebooks over time (despite a temporary refocus on the premium and corporate segments in 1997), and as emerging market segments — such as work at home, telecommuting, and small business — garner more attention from vendors, these solutions are expected to proliferate. Today's

PORTABLE PC SHIPMENTS VS. DESKTOP PC SHIPMENTS, 1996–2001



Source: International Data Corporation, 1997

solutions encompass videoconferencing and wireless online stock trading; technologies such as multimedia, communications, and connectivity are expected to gain prominence in the coming years.

IDC believes that the continuing changes in work habits, the increase in worker mobility, and demand for product upgrades to faster CPUs, larger and brighter displays, larger storage and memory requirements, and enhanced communications features will fuel the portable PC market.

The ongoing improvement in the price/performance ratio of notebooks is a major factor behind the global boom in portables. Increased adoption of the notebook as a desktop substitute (especially in the United States), driven by corporate belt tightening (mandating one computer per employee), will continue through 1997 and 1998, influencing improvements in docking station and slice options. In addition, the go-go, around-the-clock pace of business is driving increased adoption of portable PCs as flexible productivity tools.

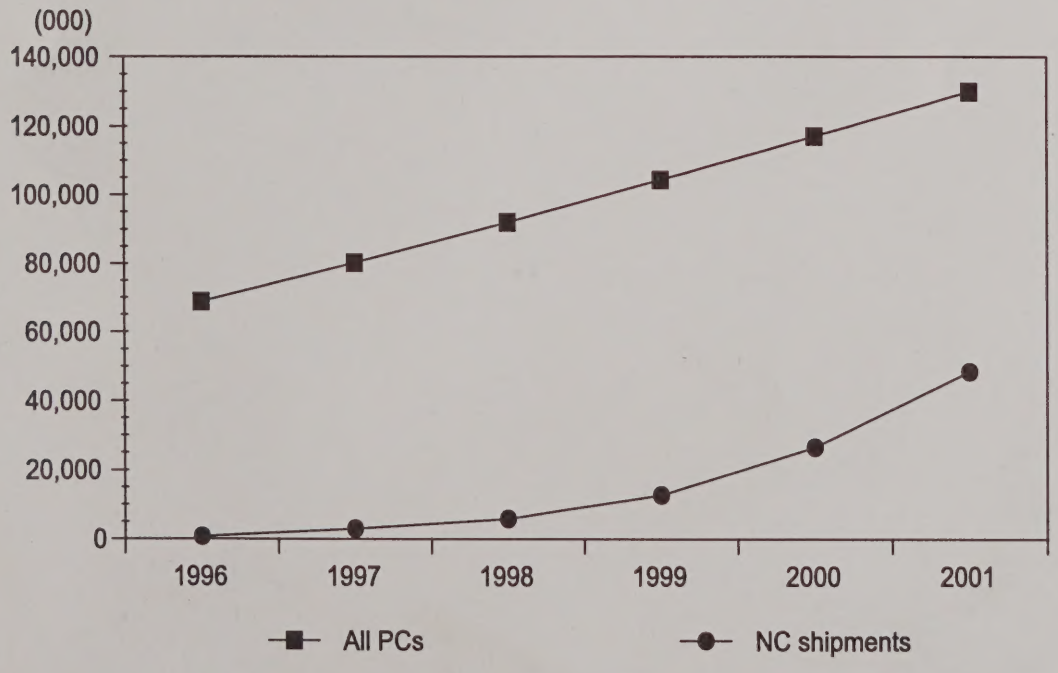
Portables have not been able to ride the coattails of the increase in global purchases of home PCs. IDC does not believe that notebooks will constitute a consumer phenomenon in 1997, even though Compaq is expected to maintain a product line in that space. Only when notebooks with a rich set of multimedia features (including Sound Blaster-compatible audio, 3D graphics, 12 × CD-ROM, 12.1″ or larger displays, and stereo speakers) reach price points between $1,500 and $2,500 will consumers flock to the platform.

Portable shipments are expected to increase at higher worldwide annual rates than desktop shipments from 1997 to 2001. Another measure is the proportion of worldwide PC unit shipments represented by portables, which increased to 17.3% in 1996. We project that this will increase to 18.4% in 1997 and to 20.7% in 2001.

NCs: A Threat Yet?

The NC market is gaining modest momentum because the growth-starved communications, computing, and consumer electronics industries are looking to provide low-cost, easy-to-use devices that tap into the growing capabilities of the Internet. Accelerated investment in the network computing market is resulting in a growing array of product designs, building-block technologies, big-name market entrants, services, and content.

Worldwide Shipments of PCs and NCs, 1996–2001



Source: International Data Corporation, 1997

IDC contends that a network computer is very much a concept with many varied implementations. We are segmenting the market into two major categories: enterprise NCs and information appliances. The enterprise NC category encompasses NCs that will be used primarily outside the home, and the information appliance category consists of devices that will be used primarily inside the home.

Long term, NCs that are projected to win the greatest market success are building off already-existing devices and usage metaphors. IDC pins the greatest chances of success on etTVs, game consoles, and smart handheld computers. From a dollar perspective, the largest category of network computers by 2001 will be smart handhelds. Consumer-targeted products, such as NetTVs and game consoles, will lag far behind because of much lower average device prices.

What impact will these devices have on PCs? In the short term, they will have little, but by the end of the forecast period, the PC market will feel the presence of NCs. IDC forecasts that nearly 50 million NCs will ship in 2001. This number is nearly one-half the forecast size of the desktop market in 2001, and it's more than one-third the size of the overall PC market.

Most NCs will act as terminal replacements, but the desktop PC market also will suffer some slowdown stemming from the NC market by the end of the forecast period.

NC solutions will be targeted solutions for most customers, however. Home users who desire only an Internet connection might purchase a NetTV, and organizations with specific communications needs but without hard-core computing needs (like schools or universities) may realize cost-benefit savings through enterprise NCs. Yet users that need to work in business applications (like databases), communicate on the Internet, access data from CD-ROMs, or perform any combination of computing functions will continue to demand a machine that can perform all of these functions independent of a network. For independent computing, the PC remains the best solution.

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Computer Industry Report

THE GRAY SHEET

Global market intelligence on the information technology industry since 1964.

The 1997 Global IT Survey: U.S. Business Spends Again

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June 1, 1997
IDC #13650
Vol. 32, No. 6

How does information technology really help businesses? What do IS executives and top industry executives consider the most strategic investments in IT in the next year? Where will buyers invest their money?

Advancements in specific information technologies cause the answers to these questions to change constantly. Is it time for the Internet to assume the role of dominant communications platform? Are IS managers ready to hop on the network computer bandwagon?

Each year, IDC conducts its *Global IT Survey* to determine the answers to the above questions and more. The survey is designed to provide a comprehensive view of demand-side expectations regarding IT spending patterns, implementation plans, and acceptance of new technologies across all major IT sectors.

IDC constructs its projections about the role of IT in corporate environments by dividing the *Global IT Survey* into a dual-level research tool. One section polls top corporate executives, and the other section polls top IS executives to determine differences in perceptions and points of view regarding the corporate IT climate and spending trends.

The *Global IT Survey's* dual-questionnaire approach shows the influence and importance of IT for corporatewide business decisions as perceived by the persons most responsible for those decisions: top management — and it shows how IT is applied and what technologies will be most useful to providing business solutions as perceived by the persons responsible for implementing these solutions: IS managers.

This issue of *The Gray Sheet* examines the U.S. findings from this rich source of data for the IT market. Some of the findings from the *1997 Global IT Survey* include the following:

- A very large percentage of top executives in the United States consider IT to be a source of competitive advantage for their companies,

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Associate Editor
Rick Miller

Production
IDC Publications

Editorial Advisers
Donald C. Bellomy Doug McLeod
Lloyd Cohen John Gantz
David Vellante Gigi Wang
Bruce Stephen Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573,
Oxon Hill, MD 20750-0573

■

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and in most cases outside factors such as poor economic conditions will not preclude further IT investment.

- Top management considers the head of the corporate IS department to be part of the corporate business strategy team nearly one-half of the time.
- Top executives and IS managers consider the Internet increasingly important to business strategy, and IS managers anticipate increased investment in Internet technologies.
- PCs have permeated corporate culture, but spending on this technology will remain strong in 1997.

BIG BUSINESS: TOP EXECUTIVE FINDINGS

The 1997 Top Executive Survey section of the Global IT Survey explores the relationship between corporate business strategies and IT decisions. It measures the attitudes and opinions of top executives regarding current market trends and business priorities and the role of information technology in the organization.

The Top Executive Survey was administered to CEOs, COOs, corporate presidents, and high-level vice presidents who worked in organizations that had 250 or more employees and a centralized IS department. Approximately 300 top executives from three vertical markets (finance, manufacturing, and retail/wholesale) took part in the survey. Although the survey results should be projected only among these industries, the responses from the executives in these industries can indicate general trends in thinking among top executives across U.S. industry as a whole.

INFLUENCE OF IT ON CORPORATE STRATEGY

A majority of top executives (73%) agreed or strongly agreed with the statement that IT is a source of competitive advantage for their companies. An even greater percentage (86%) agreed or strongly agreed that IT is a tool that improves operational efficiency within their respective industries. Nearly 70% of top executives agree that their individual company's IT strategy is aligned with its business strategy.

The top IS manager is considered part of the business strategy team by nearly one-half (47%) of top executives. An additional 39% of top management — although they don't consider the IS manager part of the business strategy team — consider input from IS management when making business decisions. About 12% of top execs do not consider the IS manager involved with business strategy.

Conversely, while top IS personnel have some say in the corporate business strategy much of the time, their business unit manager counterparts have significantly less say in IT decisions. More than one-half of top executives report that their business unit managers rely solely on an internal IS department to satisfy all IT requirements. One-third more top execs say their business unit managers consult internal IS departments before

ultimately selecting IT products or suppliers.

Not surprisingly, more than 80% of top executives consider the IS manager to be important to corporate IT strategy. The vast majority of top execs also reported satisfaction with the speed and effectiveness of their companies' centralized IS groups.

Top Executive Decisions on IT

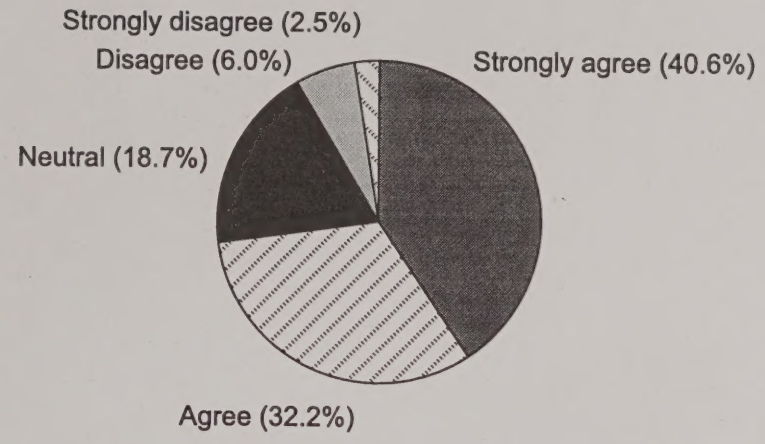
Top executives consider IT investments important enough not to be delayed because of outside economic factors; 54% disagreed that IT implementations depend on external economic trends. Only 20% of top managers reported that outside economic factors could affect IT investment.

In general, top executives have no formal plans to assess the effectiveness of their IS departments in 1997. The majority of top managers report that assessment of IS will be done through informal comparisons based on public information. A notable share of top managers (about 7%) would like to assess the effectiveness of their IS departments but are not sure how to do so.

Although top executives view IT as essential to competition and will continue to invest in IT solutions under nearly any economic conditions, and although most top executives use no formal way to measure the effectiveness of their IS departments, the picture is not completely rosy for IS managers. More than three-fourths of top executives expect to outsource all (1%) or some (75%) IS functions in 1997.

U.S. Top Executives' Views of IT as Source of Competitive Advantage

Question: On a scale from 1 to 5 (with 5 being strongly agree) please rate your level of agreement that IT is a source of competitive advantage.



N = 283

Note: Mean U.S. top executive responses from three industries: finance, manufacturing, and retail/wholesale

Source: IDC's *1997 Global IT Survey*

The reasons top executives plan to outsource IS are varied. Cost reduction and improved focus were popular reasons among top managers; accelerating the transition to new technology also was mentioned as a motive to outsource IS functions.

When asked why they would elect *not* to outsource, top executives cited insufficient justification and the fact that IT is a strategic asset as their reasons to keep IS duties in-house.

Top Executives and the Internet

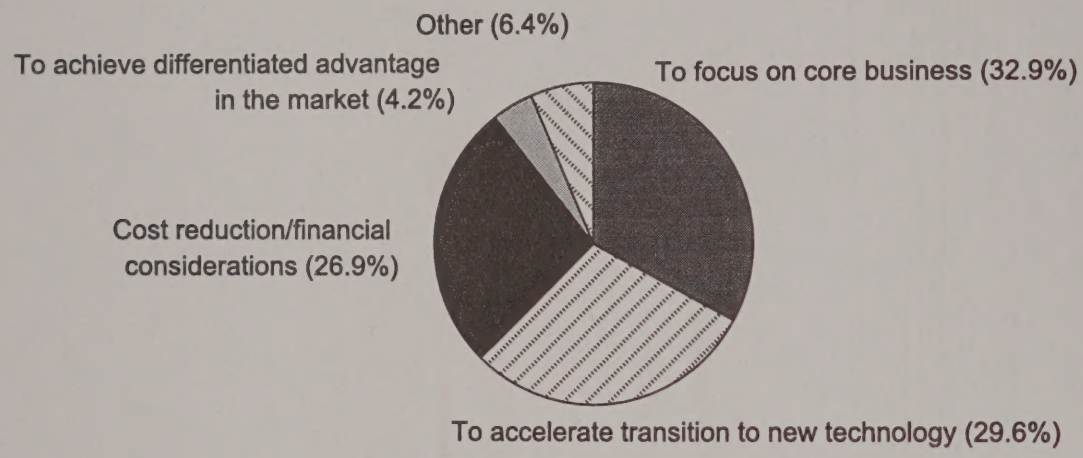
In the minds of top executives, the Internet is increasing in importance as a tool for doing business.

When asked to rate the importance of the Internet for conducting business in 1996, on a scale from 1 to 5 (5 being most important), top executives across the three industries sampled in this survey rated it between 2.08 and 2.20. When asked to rate the importance of the Internet at the end of 1997, the scores jumped to between 3.21 and 3.44.

Across the three industry segments, top executives valued the Internet for its ability to improve market research and to improve customer satisfaction. However, they had distinct reasons preventing Internet use in their organizations. The reasons top management cast doubt about exploiting the Internet varied by industry, with security the leading concern.

U.S. Top Executives' Primary Motivation for Outsourcing IS Tasks

Question: Which of the following describes the primary motivation for IT outsourcing in your organization?


Other (6.4%)
To achieve differentiated advantage in the market (4.2%)
To focus on core business (32.9%)
Cost reduction/financial considerations (26.9%)
To accelerate transition to new technology (29.6%)

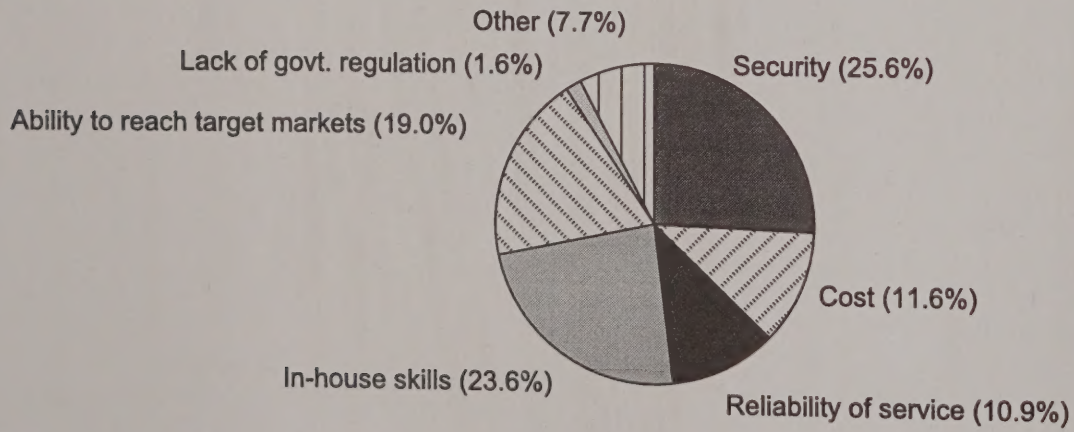
N = 67

Note: Mean U.S. top executive responses from three industries: finance, manufacturing, and retail/wholesale

Source: IDC's *1997 Global IT Survey*

U.S. Top Executives' Primary Obstacles to Implementing Internet as Corporate Resource

Question: Which is your primary obstacle to your organization's successful exploitation of the Internet?



N = 258

Note: Mean U.S. top executive responses from three industries: finance, manufacturing, and retail/wholesale

Source: IDC's *1997 Global IT Survey*

IN THE TRENCHES: IS MANAGER RESULTS

To determine the short-term trends in IT purchasing and the current and impending uses of technology, one must examine the forecasts and points of view of the decision makers closest to the implementation of such technology: the IS managers. Although top executives direct overall corporate strategy, in which IT can play a major role, the IS managers themselves choose the technology they determine best suited to meet the corporate goals established by their top-executive bosses.

IDC's *Global IT Survey* polled IS managers for their views regarding their respective companies' spending trends, software and hardware adoption, and expected use of Internet/intranet and Web technologies.

PROJECTED IT SPENDING

IDC split anticipated spending into operating and capital budgets to determine the relationship between internal costs (such as staff, services, and minor hardware and software purchases) and larger expenses purchased as capital. The average 1996 capital spending budget for IT was $20,000 per site, and logically, the average spending varied greatly according to site size. (Small sites spent about $12,000 on capital IT expenditures in 1996; medium sites spent $133,000, and large sites spent $1.5 million.)

On the whole, IS managers expect operating budget expenditures to increase 5.4% from 1996 to 1997. This is a significant finding because 1995–1996 budgets were projected to shrink (-6.1%). IDC believes this dramatic change in IS manager expectations is rooted in increased optimism from smaller sites, possibly stirred by the hype and anticipation surrounding the Internet.

IS managers and their staffs will be interested in the findings from one specific segment of the operating budget questions: 36% of sites anticipate IS staff salaries will increase in 1997, 50% expect salaries to remain the same, and only 3.6% expect a decrease in spending on staff salaries. Larger sites showed a strong propensity to increase salary expenditures; 63.5% expected to spend more on IS paychecks.

The typical IS staff consists of 35% managers, 31% technical operations people, 16% business system personnel, 9% systems developers, and 8% "other" staff. Large sites reported significantly fewer people in management positions (14%).

TRENDS IN HARDWARE AND SOFTWARE PURCHASING

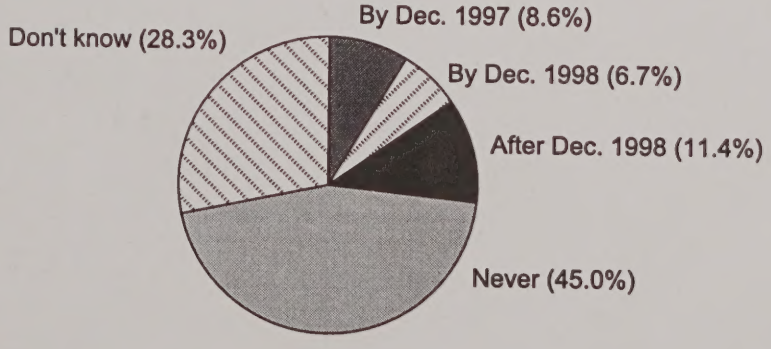
PCs have all but completely penetrated U.S. business. More than 91% of sites reported having IBM-compatible PCs in use; 12% have Macintosh systems. Roughly one-half of all sites plan to purchase PCs in 1997. The banking industry had the greatest portion of sites indicating plans to purchase PCs (80%).

Notebook penetration is significantly lower than overall PC penetration; 30% of sites have IBM-compatible portables, and 6.2% of sites have Macintosh portables.

A significant portion of respondents indicated they expected

U.S. IS MANAGERS' PLANNED TIME FRAME FOR ADOPTION OF NETWORK COMPUTERS

Question: When do you plan to purchase a network computer?



N = 1,600

Note: Mean U.S. IS manager responses from all industries
Results are weighted by the proportion of establishments each sample site represents.

Source: IDC's *1997 Global IT Survey*

their site to purchase notebook computers (NCs) in the foreseeable future (27%).

In 1996, 52% of sites had a LAN in use, and 43% of the sites that did not have a LAN in 1996 intend to implement one in 1997. Small sites pulled the overall LAN penetration average down; 98% of large sites reported LAN use as did 84% of medium sites, but only 51% of small sites had a LAN in 1996. Of the small, medium, and large sites without LANs, 57%, 56%, and 30%, respectively, intend to install one in 1997.

Microsoft NT and Novell led the list of LAN operating systems in use. NT was in use at 27% of sites, and Novell was in use at 26% of sites, in 1996.

Slightly less than 30% of all sites had a mainframe in 1996. Mainframes are most prevalent among large companies (44%).

Prepackaged software applications are the leading choice in application development, 37% of sites reported they anticipated installing prepackaged software applications with little or no customization. Nearly 18% anticipated buying prepackaged software and adding significant customization; more than 21% anticipated custom-building their applications.

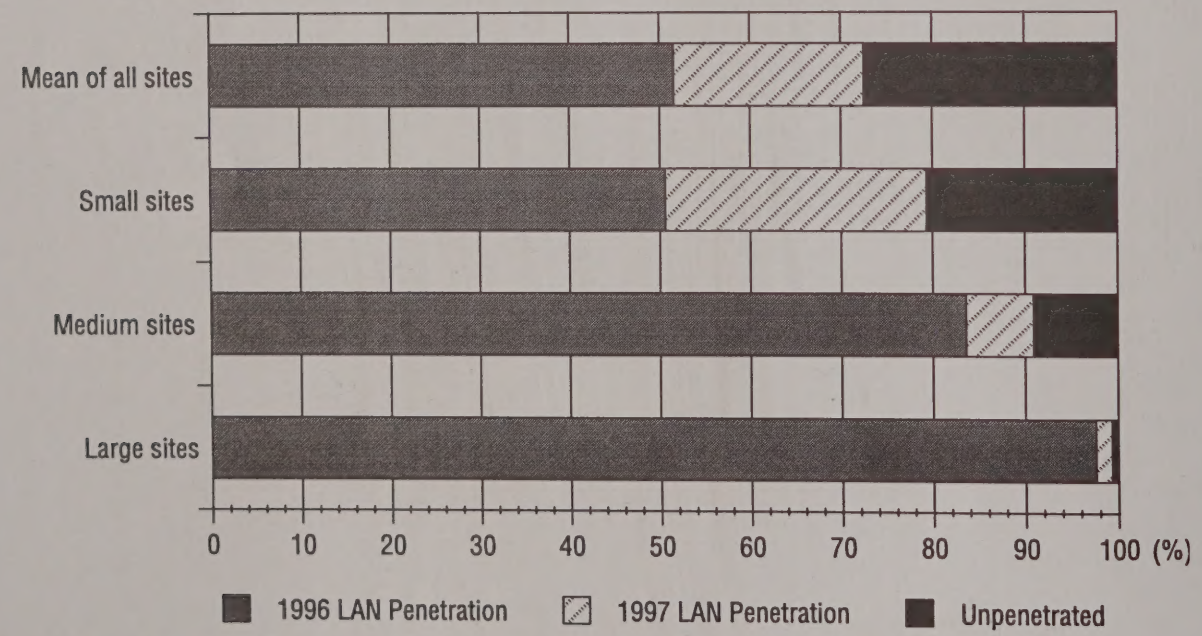
Trends in Internet/Intranet Purchasing

Almost one-half (47.5%) of all sites had access to the World Wide Web in 1996, and nearly one-third of sites that didn't have access in 1996 did plan to have it by yearend 1997. As of 1996, however, the portion of employees at each site that accessed the World Wide Web was limited (15%), and that portion, although growing substantially, would still be a minority in 1997 (32%). By the end of 1997, education (63%), federal government (48%), and professional services (42%) will have the largest portions of employees using the World Wide Web.

E-mail is far and away the most popular use for the Internet/intranets; 85% of respondents indicated it as an Internet/intranet application. Information sharing among employees and market research

LAN Penetration by Site Size, 1996–1997

Questions: Are your desktop PCs on a LAN? Will you have PCs on a LAN by the end of 1997?



N = 1,499

Note: Mean U.S. IS manager responses from all industries

Results are weighted by the proportion of establishments each sample site represents.

Source: IDC's *1997 Global IT Survey*

(41% each) also were popular applications among respondents. Interestingly, 15% of sites reported using the Internet (or their intranets) for sales transactions.

Of the types of information shared across company intranets or the Internet, employee training was the most commonly mentioned (69%). Data access and general notices followed, with slightly more than 50% of mentions, respectively.

A scant 17% of all sites reported a company home page in 1996, but this finding was heavily influenced by the response from small businesses. Only about 16% of small businesses reported a company home page while 47% and 62% of medium and large businesses did so, respectively.

By yearend 1997, 25% of companies that did not have a home page in 1996 will have one. Nearly 47% of companies without a home page report they never plan on implementing one.

Overall, 23% of respondents indicated their sites had access to a company intranet; 73% reported no access, and 4% did not know the status of intranet access.

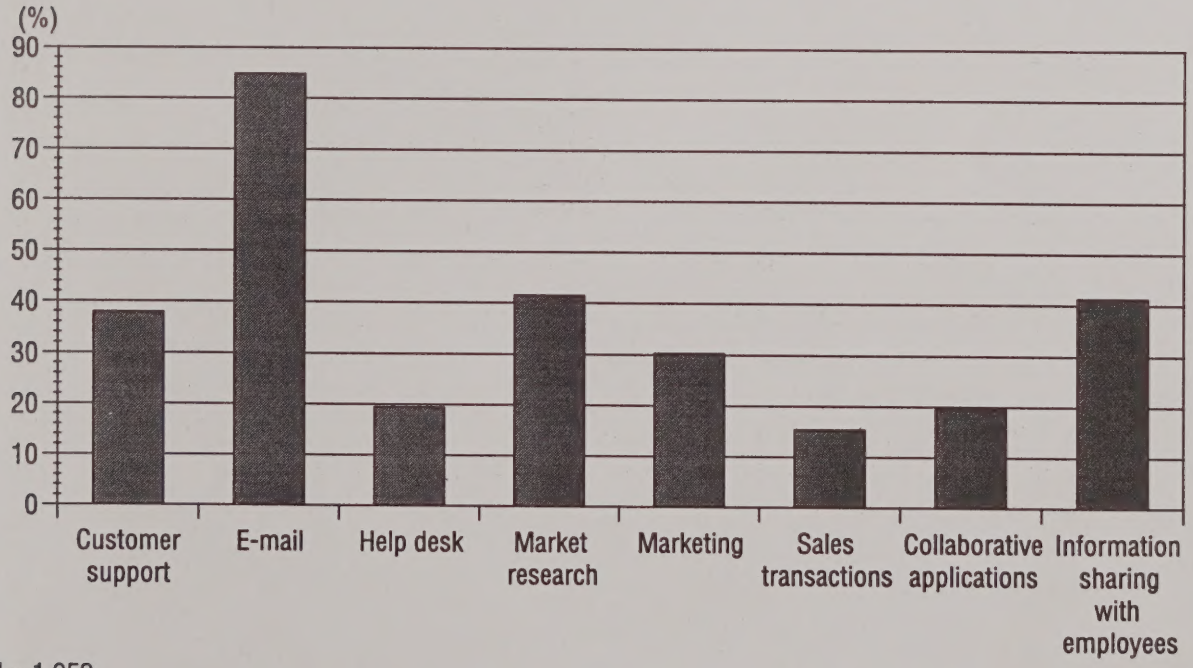
Spending on Web projects will increase significantly between 1996 and 2000. Overall average spending in 1996 was $7,800 per site. This average will increase to $27,000 by 2000. Spending varies wildly by site size, as can be expected.

The World Wide Web and Internet are having an influence on communications technologies. Advanced data communication technologies showed a remarkable increase in acceptance among IS managers in 1997 versus 1996.

Anticipated ATM use increased from 0.9% in 1996 to 7.6% in 1997, with smaller sites weighing the usage ratings down somewhat. Anticipated use of frame relay increased from 1.6%

APPLICATIONS USED ON THE INTERNET/INTRANET, 1996

Question: What applications does your site currently use on the Internet and/or intranet?



N = 1,059

Note: Mean U.S. IS manager responses from all industries

Results are weighted by the proportion of establishments each sample site represents.

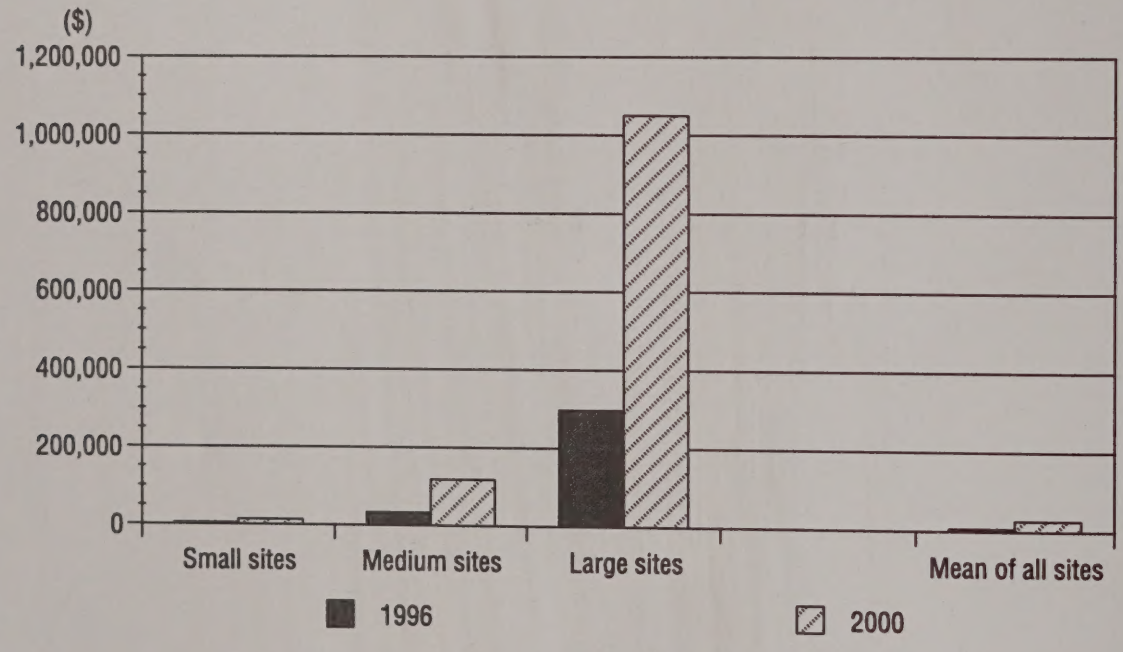
Source: IDC's *1997 Global IT Survey*

to 5.4% from 1996 to 1997, and ISDN acceptance increased from 1.3% to 4.9% for the same time period. Again, the large number of small business sites in the United States weighed down the acceptance rating of the overall U.S. business population.

No IT vendor has a vastly dominant mindshare among IS managers when it comes to Web-based solutions although Microsoft garnered 14% of mentions and IBM garnered 7% when respondents were asked what vendor was most important to Web-project success. A notable 39% of respondents did not know what vendor would be considered most important, and 22% indicated that no vendor was foremost in importance.

World Wide Web Systems, Development, and Maintenance Spending by Site Size, 1996 and 2000

Question: Please estimate the 1996 and 2000 IT spending being devoted to Web-based systems. This includes systems, software, consulting, and internal staff for both building and supporting new Web-based systems, as well as adding Web access to older systems.



N = 394

Note: Mean U.S. IS manager responses from all industries

Results are weighted by the proportion of establishments each sample site represents.

Source: IDC's *1997 Global IT Survey*

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Computer Industry Report

THE GRAY SHEET

Global market intelligence on the information technology industry since 1964.

The Western Europe PC Market: Why Is It Dragging Its Feet?

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May 15, 1997
IDC #13604
Vol. 32, No. 5

While PC markets flourished in other parts of the world, Western Europe looked tired in 1996 — unit growth over 1995 was only 7% whereas total worldwide markets grew by 17%. The picture worsens when Western Europe is compared with the high-growth markets of Eastern Europe and the Middle East and Africa, where PC markets reached high double-digit growth in 1996.

What caused the dramatic slowdown in PC shipments to such a developed region of the world? Certainly a number of aggravators encouraged the market to slacken, but perhaps none caused more lethargy than the very development of the region itself. Greater penetration in target markets is becoming a significant obstacle for PC vendors looking for business in Europe, and vendors will be forced to rely on new forces like the Internet to drive the next wave of consumer and business adoption.

Additional factors also restricted market growth. High PC prices for consumers because of value added taxes, general economic uncertainty caused by countries striving to reach European Monetary Union (EMU) standards, the end of the Pentium upgrade cycle, and skepticism over the Internet and multimedia applications all played a role to hold back demand.

Western Europe's performance was the worst of any regional PC market in 1996, and its forecast growth through 2001 will not improve its position. Occasional annual volume declines will no longer be only a feature of sometimes sluggish business markets. Sales growth in the home sector will falter in parts of Western Europe as penetration increases in households that are most financially able and willing to purchase PCs.

Is the Western Europe PC market destined for a steady slide into commodity status so soon into the PC's golden age? Or will Bill Gates' exhortations at the World Economic Forum in Davos, Switzerland, spawn a wide-scale new investment in IT and PCs? While no broad turnaround is imminent, several pockets of significant opportunity exist:

- On a country-by-country basis, significant growth opportunities exist. Ireland and Spain, for example, will exhibit strong growth.

IDC International Data Corporation ■ 5 Speen Street, Framingham, MA 01701 ■ (508) 872-8200

THE GRAY SHEET

Associate Editor
Rick Miller

Production
IDC Publications

Editorial Advisers
Donald C. Bellomy, Doug McLeod
Lloyd Cohen, John Gantz
David Vellante, Gigi Wang
Bruce Stephen, Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573,
Oxon Hill, MD 20750-0573

■

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- Notebook PCs will continue strong sales as desktop replacements and as first purchases for new users.
- The MMX chip, combined with better multimedia software and faster CD-ROMs will help drive sales.
- Many Apple users will migrate to the Wintel platform.

The challenge for vendors will be to find these pockets of opportunity and exploit them. This issue of *The Gray Sheet* explores the accelerators and inhibitors for the PC market in Western Europe, for the near term and not-so-near term, and provides insight on the state of the individual country markets. It also provides information regarding market sectors and form factors — two segments of the Western European PC market that savvy vendors will watch closely and take advantage of when appropriate.

FINDING THE OPPORTUNITY

THE NATIONAL PERSPECTIVE

Because of size disparity, the larger nations in Western Europe exert tremendous influence on the performance of the region as a whole. The tribulations of Germany's PC market were a major influence on Western Europe's market stutter in 1996; shipments to German home users *decreased* 14%. France and Italy, despite low household penetration levels, failed to live up to expectations as well.

The hesitancy of home consumers and businesses alike toward PC investment in part is blamed on macroeconomic conditions in Europe stemming from the Maastricht treaty, which stipulated that nations wanting to participate in the pending EMU must meet standardized budgetary requirements. One of these requirements is a budget deficit below 3% of GDP, and as the January 1, 1999, deadline approaches, most countries are curbing their deficits through restrictions on government spending.

Budget restrictions mean less government spending on IT investments, obviously directly affecting PC spending; they also mean a downsizing of public workforces. However, the prospect of a unified economy and its increased competition also leads to private sector streamlining — precluding IT investments and forcing job cuts. Unemployment in many Western European nations is high; consumer confidence is low. (Germany's 12% unemployment is the highest rate since the 1930s.)

Despite the dire circumstances, not all of the Western Europe PC markets have stalled. Spain has one of the highest unemployment rates on the continent, but the value of its PC market is forecast to grow 7.5% between 1996 and 2001. The value of the markets in Italy and France will grow 8.4% each, and Ireland's market value will approach 10% growth for the same time period. However, the market value growth for Western Europe is 5.8%, compared with 14.8% growth for the United States.

Growth in shipments corresponds accordingly with the growth in market value, in most cases exceeding values slightly because of declining average sales prices (ASPs). Interestingly, the 1996–2001 revenue growth for Spain and Italy is predicted to exceed their respective shipment growths, indicating PC interest in these countries will be for more sophisticated models than con-

sumers in these markets are purchasing now.

Note: Growth rates do not include PC servers.

THE MARKET SEGMENT PERSPECTIVE

BUSINESS

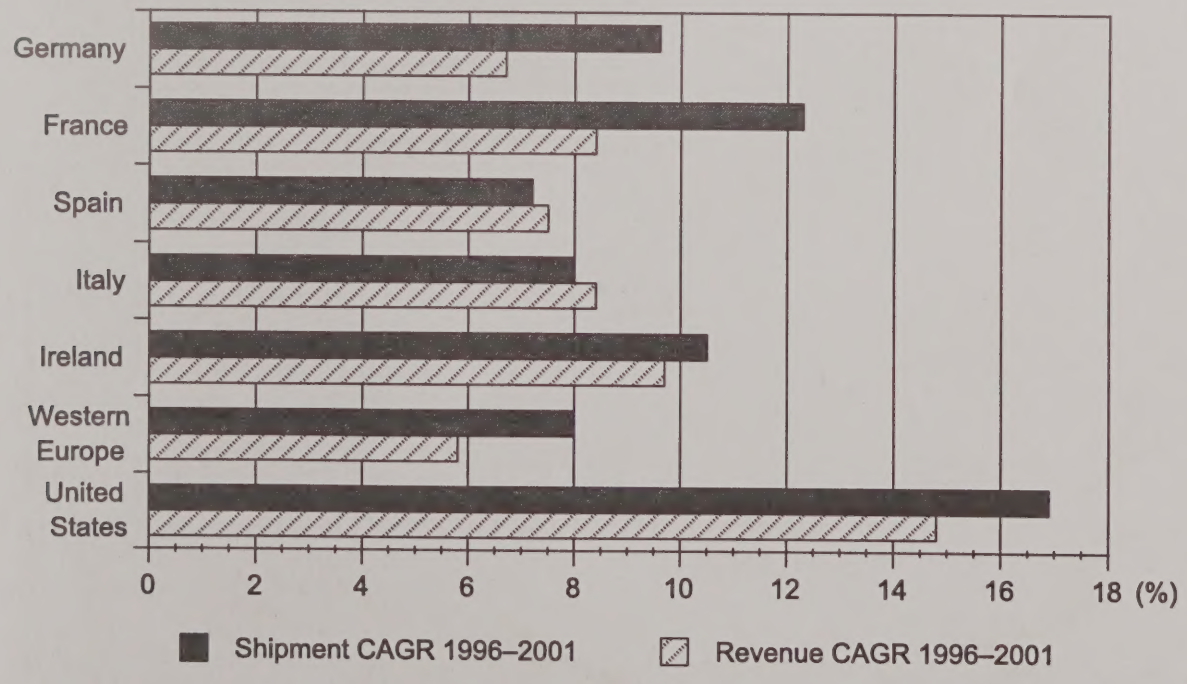
The business sector's 15% growth in unit shipments offset the poor performance in other segments to a degree. Renewal of desktop and mobile PC installations with Intel Pentium-based systems continued, particularly in large (sites with more than 500 employees) and medium (100 to 499 employees) companies. The small office (fewer than 10 employees) and small business (10 to 99 employees) market segments continued to grow well, but not quite at the same pace as for larger firms.

The outlook for 1997 is still healthy, but growth is expected to fall to a respectable 11%. Following a period of rapid upgrading and many new PC installations in the medium business segment during 1995 and 1996, IDC expects growth will fall to single digits. However, smaller companies are expected to generate approximately the same increases as experienced during 1996. Although penetration of white collar workers at sites with fewer than 100 employees already is fast increasing, some of the residual base of older technology systems still requires renewal, and a large number of new users will require PCs.

Large companies will continue upgrading the last remnants of older systems to the Intel Pentium platform. In addition, corporations that have planned to make the transition to Microsoft Windows NT on the Intel Pentium Pro platform will be buying further volumes. Once prices of Pentium Pro PCs have dropped and the majority of corporate applications have transitioned to 32-bit, the argument for upgrading at least some departments or individuals therein will be more compelling.

The business sector demand for PCs already is driven primarily by upgrade/replacement cycles, even in smaller businesses. However, the current cycle will not continue forever, and high penetration rates strongly indicate a downturn in market fortunes during 1998. Whereas some countries (e.g., Italy and Spain) are still in the process of moving to the client/server model with consequent benefits to PC vendors, most nations are already well advanced in implementing LAN-based solutions. In certain countries, especially in the Nordic region, there is a significant danger that shipments to the business sector will fall for a

WESTERN EUROPE NATIONS WITH ABOVE-AVERAGE GROWTH, SHIPMENTS, AND MARKET VALUE, 1996–2001



Source: International Data Corporation, 1997

period because of saturation. Moreover, economic prospects and business confidence levels will still be poor in many Western European countries. Nevertheless, businesses will continue to be the major market for PCs through the end of the decade.

Average spending per unit is expected to decrease by only 2% on average per annum for Western Europe as a whole, despite heightening competition and downward pressures on pricing. The increasing proportion of mobile PC purchases will help to sustain value growth rates close to that of units.

As markets become more saturated, the differences in growth rates and trends by country will become more marked. The timing of the peaks and troughs of demand will vary dependent on penetration levels and upgrade patterns.

CONSUMERS

The home market (PCs purchased from consumer disposable income) "matured" in Western Europe even faster than IDC expected. Unit demand growth for the region as a whole fell to a low 3% for 1996. Germany was a major contributor to this downturn; its volumes dropped by 14%. France and Italy, despite low household penetration levels, failed to experience the acceleration in home computing acceptance that was originally projected. High unemployment levels and reductions in public sector spending created a crisis of confidence among consumers in some of the most significant country markets. Moreover, no immediate signs have appeared that these problems will abate as many nations seek to meet the economic convergence criteria for the EMU.

Some countries, such as the Netherlands, which experienced continued high growth in the home sector, were often aided by some special factors. These include employees purchasing through their employers' companies under various schemes that minimized the amount of disposable income required.

Even so, some of the country markets with excellent growth during the last two years could experience year-on-year volume declines because of high penetration rates of relatively new PCs. As anticipated, growth in shipments is already moderating in many countries that have highly developed home PC markets. This moderation is due to high penetration of households that understand the benefits of owning a PC and can afford one (often referred to as "target households").

A major factor constraining the growth of the home sector, discouraging comparison with expectations in the United States, is much higher prices in Western Europe. The additional costs of doing business plus the rate of value added tax typically adds between 30% and 50% to the price a consumer must pay. This means that the entry-level price points for the purchase of new systems are out of the reach of a large section of the population. Although PC prices are coming down, no Europewide breakthrough in logistics or taxation will overcome this barrier in the foreseeable future.

The penetration of households with PCs comes not just from those purchased from personal disposable income. Activity is increasing in the provision of second-hand PCs to homes. As businesses upgrade their PCs, often they are passed to employees or resold through a third party. Western European households, in general, have less disposable income than their U.S. counterparts, and prices for new PCs are much higher. Therefore, the popularity of second-hand systems is expected to grow. (IDC counts transfers of PCs to the home installed base, but these do not constitute new shipments.)

Some countries exhibit poor long-term growth because of the saturation of target households. However, the home computing markets in Italy and France are significantly underpenetrated and much potential remains. Moreover, the large installed base of home PCs will be renewed continuously. Therefore, the home sector for Western Europe as a whole will experience growth rates of around 10% in unit terms for most of the decade. By 2000, 50 million PCs will be installed in homes. This number, however, does not include all the alternative devices — set-top boxes, videophones, and game systems such as the Sony Playstation — that will provide many communication functions, including Internet access. Indeed, for cost-conscious households or users with limited needs and expectations of home IT, alternatives to the PC will detract from the growth prospects for the PC market.

GOVERNMENT

Government growth rates will be slightly below those for the business sector because the speed of client/server adoption and the pace of upgrades is typically slower. Constrained by the public purse, government sites are usually more cautious in their hardware purchasing, and they demand lower-priced configurations at a volume discount. Moreover, mobile PC penetration and the expected future proportion of purchases that notebooks

account for are lower than in businesses.

The demand for PC units from government establishments fell by 5% in 1996, following excellent growth of 17% in the prior year. The drop in sales resulted because the most urgent PC renewal needs already have been fulfilled, and more important, government capital expenditure was constrained as many countries sought to meet the EMU criteria. IDC expects growth in the government sector to remain very low in the next few years for the latter reason.

EDUCATION

Although it is expected that this segment will grow following the poor performance in 1996, the levels of improvement will vary substantially by country market. The weakness of some economies means that government spending on education has been cut back and investment halted. As a result, what ideally might be considered a boom time for PC shipments has, in effect, been stifled by economic constraints and political agendas. This is not universally the case, however, and some aggressive policies concerning installing PCs into education can be found across the region.

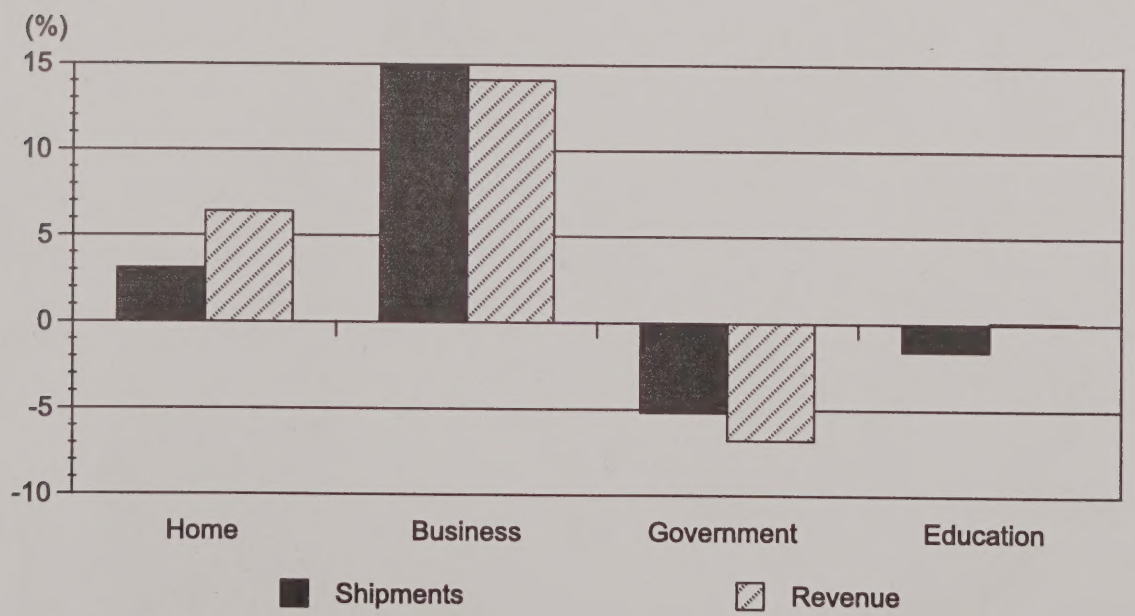
PC buyers for educational establishments increasingly desire to install systems that are compatible with those found in the normal working environment. Replacement of current Apple, Acorn, and older Intel-based systems is likely although it will not necessarily be with new Intel-based PCs. Indeed, the network computer may well find an important role as a low-cost client device connected to education establishment LANs and WANs. Nevertheless, education establishments will find an increasing role for the PC, and vendors can expect moderate growth for most of the decade.

THE FORM FACTOR PERSPECTIVE

DESKTOPS

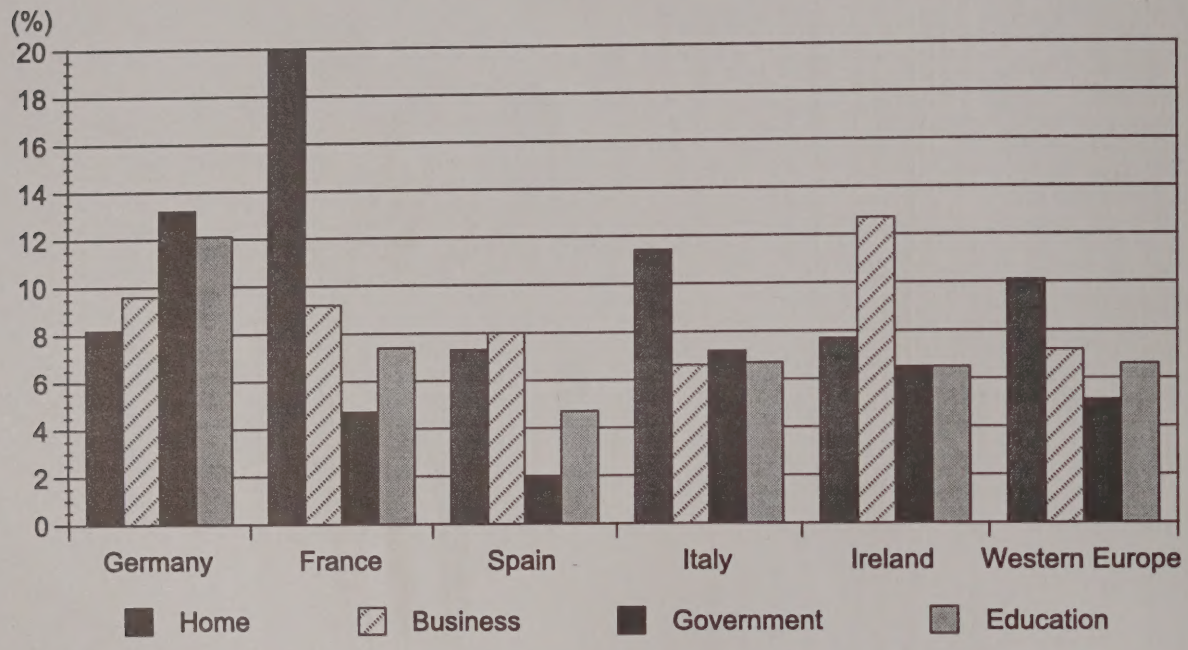
The Western Europe desktop PC market has displayed some sluggish dynamics in the past year. Unit shipment growth slowed from the 20% of 1995 to 8% for 1996. The primary cause of the fall in growth rate is the disappointing performance of the market for PCs purchased from personal disposable incomes. Unit demand from the home sector grew by only 3% overall in Western Europe during 1996 as many country economies faltered, unemployment remained high, and consumer confidence was detrimentally affected. Following the 18% growth rate for household purchases experienced in 1995, this downturn came as a shock to many vendors targeting a sector that appears to have so much unfulfilled potential.

WESTERN EUROPE SHIPMENTS AND MARKET VALUE GROWTH RATES BY MARKET SEGMENT, 1995–1996



Source: International Data Corporation, 1997

WESTERN EUROPE SHIPMENT GROWTH OPPORTUNITIES BY COUNTRY AND MARKET SEGMENT, 1996–2001



Source: International Data Corporation, 1997

The growth in business sector demand for desktops also fell in 1996, but was still in double digits as companies in many countries continued the process of upgrading to the Intel Pentium processor platform. However, in some parts of Europe — including Sweden — signs of slowing demand became apparent in the second half of 1996 as the transition to Pentium systems was mostly completed and PC penetration of potential users reached very high levels. The business desktop market will be increasingly driven by replacement/upgrade cycles which will cause year-on-year volumes to fall in some countries.

The longer-term outlook for desktop demand is largely determined by the speed at which upgrading can be encouraged in businesses, combined with the strength of consumer desire for a home computing resource. Although growth in demand from the home sector is expected to revive slightly during 1997 and beyond, the business sector will continue to be largely constrained by high penetration rates for recently updated equipment. In addition, the impact of desktops being replaced by mobile PCs will be felt. Furthermore, the emerging alternatives for the network computer also will detract from desktop demand. Neither of these alternative formats, however, are expected to constitute an overwhelming threat to the traditional desktop PC during the next five years.

The demand for desktops will continue to grow — but more slowly than in the recent past. Increasing functionality resulting from significant technological advancements in software, communication, and all primary hardware components will continue to drive most users to renew their desktop PCs within three to five years of purchase. For example, Intel's MMX processors will spur demand somewhat in the home sector while the Intel Pentium Pro and Microsoft Windows NT combination will further encourage businesses to upgrade their key business productivity tool.

PORTABLES

Growth in sales of mobile PCs for Western Europe as a whole slowed significantly in 1996, mainly because of a minimal volume increase in Germany following the explosion in demand there during 1995. Regional growth still reached a respectable 13% in unit shipments, with much upgrading to Pentium-class notebooks. The outlook for 1997 is more promising as notebook systems incorporating higher-speed Pentium processors (including MMX versions), combined with larger screens and

integral CD-ROM drives, become available at rapidly decreasing prices. IDC expects shipment growth of 15% for 1997.

The shipment growth prospects for mobile PCs are significantly better than those for desktops in the short and long terms, even considering the fact that the vast majority of home PC purchases are desktops. When compared with business sector growth rates, those for notebooks are dramatically higher, and desktop replacement is growing popular across all sizes of companies. Even more significant, the length of time a company keeps a notebook PC is much shorter than a desktop. Consequently, upgrade demand comes around more frequently. Yet the current high year-on-year growth rates are not sustainable because only a relatively small proportion of users can justify the price premium required for notebook purchase. Saturation of this segment of the workforce is on the horizon.

Notebooks are now becoming "commoditized," a long established feature of the desktop PC market. PC manufacturers are finding that differentiating core hardware is becoming more and more difficult.

Market Accelerators and Inhibitors

Although the growth in each Western European country market is determined largely by national factors, some common accelerators and inhibitors to market growth are present, and they broadly apply, but not universally so. Certain local factors alter the evolution of a national market in terms of its response to global market accelerators and inhibitors.

Economic Conditions

Many countries are experiencing positive influences from economic factors; some, on the other hand, are still suffering from not knowing how the economy may develop. This uncertainty can dampen PC demand, often in both business and home segments, through the constraint of expenditure. Of particular note is the impact on European economies seeking to meet the criteria stipulated in the Maastricht treaty pertaining to monetary union (the "single currency"). In France and Germany, for example, striving to meet European Union requirements in this regard has indirectly increased problems of unemployment and lack of consumer confidence.

User Sophistication

Countries with high levels of PC connection to networks and usage of multiple applications will move faster upmarket in terms of processor type than countries without these characteristics. One effect of this situation is that less sophisticated users take advantage of accelerating price declines in older technologies. As a result, growth in market value may be suppressed. The demand for configurations that include, for example, high-capacity disk drives or multimedia add-ons also changes considerably by country. Therefore, the average amount spent on a Pentium desktop PC, for example, will vary widely across borders.

Penetration

When examining the penetration rates of businesses, one must take into account the number of terminals installed. Although terminals are being replaced by PCs, the rate at which this is happening differs markedly from country to country. In the next few years, the network computer will also have an impact on penetration levels. Countries with high overall penetration rates, whether in businesses or households, generally exhibit quite different market characteristics from those with low penetration. In countries where PC penetration is high, users tend to exhibit more sophisticated buying patterns. The growth of such markets is, however, primarily determined by replacement/upgrade cycles.

Business Demographics

The spread of the white collar workforce across business sites by size is also very different throughout the Western European region. For example, a much smaller proportion of the workforce can be found in large sites in the Nordic countries than in France. The impact is felt on market development because the buying patterns of large companies often differ from those of smaller ones. Larger sites tend to purchase high volumes of lower-configuration desktop PCs to act as inexpensive network clients. Compromises are not necessarily made in processor performance but more often in add-ons such as multimedia and communication components.

Fashion

Although it may seem strange to speak of fashion as an influence on PC market development, there is no doubt that it is an important factor accounting for some peaks in demand. This demand mostly applies to the purchase of home PCs from personal disposable income in that peer pressure increases demand. An individual householder who feels personally falling behind because many friends have a home PC, that person has an increased motivation

to purchase. Thus, home sector growth often moves up sharply for a period as the snowball effect of fashion accelerates demand. Fashion is also a factor in the business market, particularly in the purchase of mobile PCs, which users often regard and display as personal status symbols. Even the market for commercial desktops is partially driven by the desire, as well as the need, for a person to be working with the latest systems. One increasingly important role of the IS department is to apply cost/benefit analysis to match spending priorities with actual, rather than perceived, needs.

Platform Technology Trends

During the last two years, the global market for PCs has been affected positively by the combination of Microsoft Windows 95 and Intel's Pentium processor. Many PC users have been encouraged to retire older systems faster although early retirement does not necessarily indicate a continued reduction of the average PC's life span. The introduction of new technologies generally causes small but significant shifts in purchasing patterns through the delay or acceleration of PC purchases by a few months. For example, the introduction of Intel's MMX processors may cause some users to delay purchases until MMX PCs are available at lower price points. Conversely, more affluent buyers may be attracted to upgrade earlier than originally planned because of the application enhancements offered by MMX.

Application Software Trends

As application software increases in functionality and graphics/multimedia content, a driving force that mandates regular upgrading of PC performance comes into play. The greatest impact of application software on overall PC demand is caused by enhancement of leading office suites, especially Microsoft's Office series. The timing of the office suite introduction in local language versions causes minor variances in country market development. Once a critical mass of users has adopted the new office suite, the users' colleagues and others with whom they exchange files frequently, feel compelled to upgrade to the same version. This process in turn generates demand for new PCs with adequate specifications for running the new application software.

Vendor Priorities in New Product Supply

During the first few months after a new product is launched, demand often outstrips supply. Vendors have a natural tendency to satisfy the demands of their largest customers first in order to maintain competitive advantage. This practice often reduces the availability of PCs based on the latest technology in the short term, particularly to the smaller country markets. However, in country markets where a particular desire for PCs is based on the latest technologies, for example in the Nordic area, this temporary shortage of new models from leading global brands causes some noticeable market distortions. Because the new technology is not available from the major vendors, there is a tendency to turn to smaller, often locally based, suppliers/assemblers to supply the most up-to-date systems immediately.

Government Taxation Policies

Government policy has an important impact upon the development of the PC market in terms of general influence on the economy and thus disposable income and business investment levels. Governments also affect the price of a PC by adding duty. The magnitude of this tax (upwards of 20%) has caused many companies and their employees, who both benefit from a home PC installation, to seek ways of legally avoiding value-added tax. The traditional thirteenth-month salary or quarterly bonus is sometimes translated into the "gift" of a PC, partially or wholly exempt from normal taxes.

State authorities also influence the development of the infrastructure in which PCs operate, particularly in terms of communication infrastructure and costs. Governments have a direct impact as well on the uptake of PCs by education establishments and, of course, consumption by government sites. The convergence criteria for the European Monetary Union have forced some countries to restrict spending on capital equipment for the state as part of a drive to reduce overall government expenditure.

Channel Development

The development of distribution channels is both driven by demand and a driver of demand. When a country has few consumer retail outlets or a particularly localized distribution profile, potential users are often less exposed to PCs and thus less likely to consider their purchases. Furthermore, whereas a few vendors are able to restrict access to channels, a situation of imperfect competition arises. Fierce price competition may not develop, and thus demand may be suppressed. The resistance of buyers in some countries to direct response methods of PC purchase can also cause prices to remain at a higher level.

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Computer Industry Report

THE GRAY SHEET

Global market intelligence on the information technology industry since 1964.

Middleware: Disparate Enterprises Equals Desperate Need

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May 1, 1997
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Vol. 32, No. 4

One can argue that advances in connectivity technology have fertilized the growing worldwide marketplace because of their implicit mission to expedite business processes unbounded by geography. But what acts as the connectivity moderator among the distributed information resources of a multinational (or even only multibuilding) enterprise? Increasingly, middleware does.

Network managers responsible for information systems comprising varied components (e.g., application servers, databases, heterogeneous operating systems, etc.) may be too restricted by the connective technology embedded within the software architectures of these components. Middleware eases some of the restrictions.

Middleware is layered on top of the network components' software, thus it carries out its orchestrations independent of the operating environment of the components. It is compatible with new technologies and will play a crucial role in adding value to Internet technology to make it more conducive to the needs of enterprise systems.

The worldwide middleware market is forecast to be nearly $6 billion in 2000; it was slightly less than $1 billion in 1995. The following are several factors — both economic and technological — that will drive interest in middleware during the forecast period:

- As multinational businesses expand in both number and size, distributed computing solutions will be essential.
- Customer recognition of middleware advantages, and the subsequent increase in demand for these technologies, will push vendors to distinguish themselves by expanding middleware capabilities.
- Middleware with expanded capabilities will streamline distributed computing by handling more functions from distributed applications. This will foster a cycle of better product and stimulate further demand.

This issue of *The Gray Sheet* explores how middleware directly benefits distributed computing and explains who stands to profit as the middleware market grows.

WHAT IS MIDDLEWARE?

Middleware is an independent software and services system that distributed business applications

THE GRAY SHEET

Associate Editor
Rick Miller

Production
IDC Publications

Editorial Advisers

Donald C. Bellomy	Doug McLeod
Lloyd Cohen	John Gantz
David Vellante	Gigi Wang
Bruce Stephen	Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573,
Oxon Hill, MD 20750-0573

■

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may consistently use to share computing resources across heterogeneous technology. It is layered on top of the client and server operating systems that host the computing resource as well as the communications networks connecting them together.

As an essential enabler of distributed computing, middleware delivers increased customer benefits such as freedom of choice and technology independence, uniformity and transparency, adaptability and flexibility, simplicity over complexity, lower-cost application development, reduced application maintenance, and the enablement of new technology such as the Internet.

IDC first published its definition of middleware in *New System-Level Software Market Taxonomy and Preliminary Market Sizing* (IDC #11199, March 1996). IDC's definition of middleware excludes all products with embedded connectivity technology.

WHY THE DEMAND FOR MIDDLEWARE?

INDUSTRY MIGRATION TO INCREASINGLY DISTRIBUTED TECHNOLOGIES

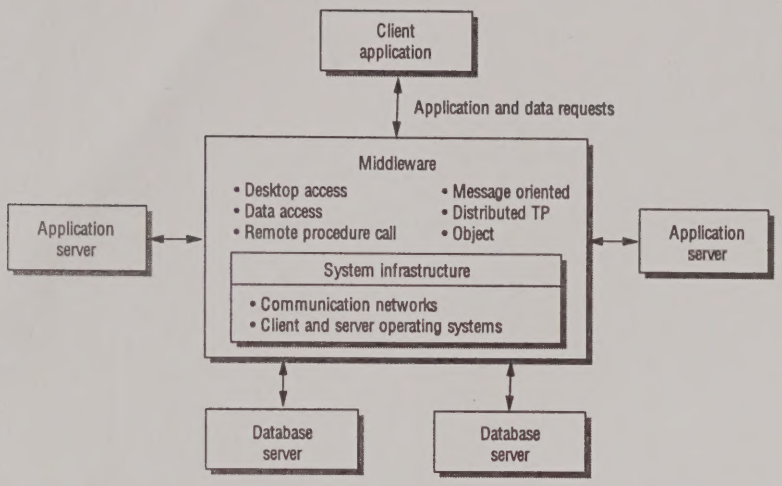
The business requirements of the next 10 years increasingly will favor a computing model that is distributed rather than centralized. During this period, successful companies will operate in a business environment that is characterized by the following:

- **Worldwide marketplaces.** To compete worldwide, businesses will increasingly spread out.
- **Rapid response to ongoing change in business and technology.** In order for companies to compete globally, acquisitions and mergers, business consolidations, and government deregulation will occur worldwide.
- **Offshore movement of manufacturing jobs.** This will take advantage of lower labor costs outside the United States.
- **IS technology.** To achieve competitive advantage, IS technology will be exploited.
- **Integrated enterprisewide computer systems.** These systems are designed to exploit the information resource.
- **Coexistence with existing systems.** To leverage past IS investments, coexistence must take place.
- **Integration.** New technology will integrate with existing systems.

These requirements place a premium on diversity, flexibility, and rapid change. Customers will need to build an infrastructure to consistently support a mixture of hardware platforms, operating systems, networks, databases, and application development tools. The islands of automation that are predominant in today's centralized information systems are inflexible and slow to change. They are not well-suited to meet the changing business requirements. The monolithic computing model has reached its limits.

From an application viewpoint, distributed processing entails the separation of a program into discrete components, each of which may be deployed across different locations in the network. Thus, middleware becomes the essential enabler of distributed processing because the objective of middleware is to provide the system software used by an application program to connect its components. To be effective at this job, middleware must be independent

INDEPENDENT MIDDLEWARE: THE APPLICATION-CENTRIC MODEL OF DISTRIBUTED COMPUTING



Source: International Data Corporation, 1996

of the operating environment that hosts these components.

Accordingly, there is a natural fit between middleware and many of the new technologies being adopted by the industry today. One current example of such a natural fit is today's fascination with the Internet. For many reasons, tomorrow's vision of deploying large-scale applications over an Internet backbone will require — and increase the customer need for — middleware (see *Making the Internet More than a Toy: Middleware to the Rescue*, IDC #12168, September 1996).

WIDER RECOGNITION OF THE ESSENTIAL ROLE OF MIDDLEWARE

As customers experiment with building increasingly distributed applications, they will push middleware vendors to build greater functionality and performance into their products. The revenues from increased middleware product sales will fund further middleware product development.

As the functionality and performance of middleware products increase, a gap will appear and independent middleware products will be recognized by customers to have more to offer than the alternative use of connectivity technology that is embedded within another software product. Faced with this growing gap, customers will increasingly recognize the essential role that middleware plays in enabling distributed application infrastructures. In addition, the growing diversity of middleware products will lead customers to recognize that there is a need to mix and match multiple middleware products in order to optimize their distributed application infrastructure.

EXCELLENCE OF MIDDLEWARE PRODUCTS DELIVERS GREATER CUSTOMER BENEFITS

Quite naturally, as middleware is recognized for its ability to deliver more value to customers (i.e., better enable them to build distributed applications), customers will find new ways to use the capabilities of popular products. This increased customer use will put further pressure on middleware vendors to deliver products with connectivity capabilities that are better and higher performing than any similar technology embedded within other classes of software.

MORE PRODUCTIVE APPLICATION DEVELOPMENT AND MAINTENANCE

A significant side effect of leveraging the diverse capabilities supported by different middleware products will be customers' discovery that they can off-load into middleware much more code, formerly hard-coded, into each distributed application. As a result, middleware use will become increasingly recognized as a key way to improve the productivity of the distributed application development and maintenance process.

Over time, IDC believes that benefits customers will gain from using independent middleware products for their distributed applications will far outweigh the benefits received from using connectivity technology embedded within other software products.

DIRECT BENEFITS: MIDDLEWARE VERSUS EMBEDDED CONNECTIVITY

The greater the heterogeneity that a customer's computing infrastructure must support, the greater the benefits from middleware use. The direct advantages of middleware outweigh those of embedded connectivity in many instances.

The benefits of middleware explained below all lead to one key attribute: lower cost for IS managers.

Superior Functionality and Scalability Through Specialization

For distributed applications with simpler requirements, in which customers will not suffer from being locked into the capabilities of one vendor's technology, the use of embedded connectivity technology may be satisfactory. Often, however, simple applications tend to grow and increase in scale. At the same time, customers are likely to be called upon to build increasingly complex distributed applications from scratch. The inevitability of this growing complexity means that the distributed applications portfolio will most likely benefit from the excellence and specialization that middleware vendors bring to the table in building their products. In turn, customers will be able to leverage these superior features in order to build superior distributed applications that lower the cost of doing business.

Freedom of Choice and Technology Independence

As the requirements for distributed applications become more complex, applications often must support more heterogeneous technologies than embedded connectivity technology can handle adequately. Middleware products are the customer's best insurance policy against vendor, product, and technology lock-in when building distributed applications.

By their very nature, independent middleware products deliver freedom of choice in several ways. They allow customers to choose freely among the different hardware platforms, system software infrastructure elements (operating system and networking software and services), and data managers. Middleware products are incredibly diverse among themselves. Not only are the products in each of the six middleware markets incredibly different in function, but similar products in any one of the individual middleware markets are different from one another.

The greater freedom to choose products leads to lower costs. Customers have more options from which to select the lowest-cost products.

A distributed application architecture that is not built around middleware may leave customer applications hostage to the strategic business interests of the vendor in which the connectivity technology being used is embedded. For example, transaction management services built into an operating system may require the use of that operating system's proprietary object model.

Uniformity and Transparency

In the ideal world, middleware delivers one family of consistent programming interfaces to the services it invokes for distributed applications. In turn, these consistent programming interfaces hide the differences between the choice of heterogeneous technologies with which middleware interoperates. The end result of this transparency is that the application is uniformly coded, independently of the customer's choice of underlying operating systems, networks, or data stores (database managers). This programming transparency acts to lower the cost of code development and maintenance.

In addition to providing a layer of programming transparency across different technologies, middleware also strives to deliver location transparency. That is, one goal of middleware is to deliver technology that allows applications to be built independently of where the distributed resource is deployed. This location transparency may substantially reduce the cost of administering distributed applications.

Adaptable and Flexible Information Systems

When distributed application architectures are properly designed on top of a middleware foundation, customers benefit by being able to build applications that can adapt to

Customer Benefits: Embedded Connectivity Technology Versus Middleware

Benefit	Embedded Connectivity Technology	Middleware
Connectivity	Yes	Yes
Superior functionality and scalability	No	Yes
Freedom of choice and technology independence	Limited	Yes
Uniformity and transparency	Limited	Yes
Adaptability and flexibility	Limited	Yes
Simplicity over complexity	Limited	Yes
Lower-cost application development	Limited	Yes
Reduced maintenance	Limited	Yes
Large-scale enterprise applications	Limited	Yes

Source: International Data Corporation, 1997

the changing times. The system's infrastructure can easily change and evolve without setting in motion a ripple effect that requires customers to change their business applications. Customers are free to pick software products from a variety of competitors, and different software components can be reused across different applications without being restricted by compliance to a specific object model.

Simplicity over Complexity

When connectivity technology is embedded within another product, it certainly is possible to provide facilities that let developers exploit the technology at a high level of abstraction, making a highly complex distributed system infrastructure simpler to use. However, the use of that high level of abstraction is limited because it can be used only within the scope of the product in which the connectivity technology is embedded. When a similar capability is required outside the scope of the product within which the connectivity technology is embedded, developers must begin anew with a different set of semantics. Compared with independent middleware products, the use may be further limited because the functions supported by the embedded connectivity technology may not be as robust as those available from a similar middleware facility in which the vendor can excel by specializing in middleware. When developers are able to use more abstract semantics to build and maintain distributed applications, the cost will be lower.

Lower-Cost Application Development

Greater application development productivity will result from the inherent middleware benefits described above. Robust middleware will take over functions that otherwise would have been coded into applications. If middleware is uniform and transparent across the infrastructure, application development productivity increases, as it does when developers can use middleware at high degrees of abstraction.

On the other hand, when application developers use connectivity technology embedded in another software product, their productivity is likely to be less if that embedded connectivity technology does not deliver the above combination of benefits.

Reduced Application Maintenance

Of course, the largest life-cycle costs for most applications occur while the applications are being maintained. Reduced application maintenance also will result from the same factors that lead to lower-cost application development. In addition, freedom of choice and technology independence are significant drivers allowing customers to reduce the maintenance costs of distributed applications. This reduction will clearly result when middleware acts as an independent layer that allows customers to modify elements of the system infrastructure and data managers that support an application without having to go in and modify application code. The potential savings are quite significant over the many years that run-your-business applications typically exist.

Internet Applications: Middleware to the Rescue

The world is caught up in the Internet/intranet craze as the latest phase in the industry's continued evolution to increasingly distributed operating environments. If this craze continues on its course, it could be the biggest boon for middleware products that these markets have yet seen. IDC believes that for customers to build large-scale applications on top of Internet technologies, they will need to use middleware. The bottom line, then, is that customer efforts to build large-scale applications using Internet technologies will hit a brick wall unless efforts include middleware products.

If customers do not use middleware to build large-scale applications on top of Internet technologies, and the use of these applications hits a brick wall after they are deployed, then those applications would have to be rewritten using middleware. Such an eventuality would clearly cost more than designing the application around middleware from the beginning.

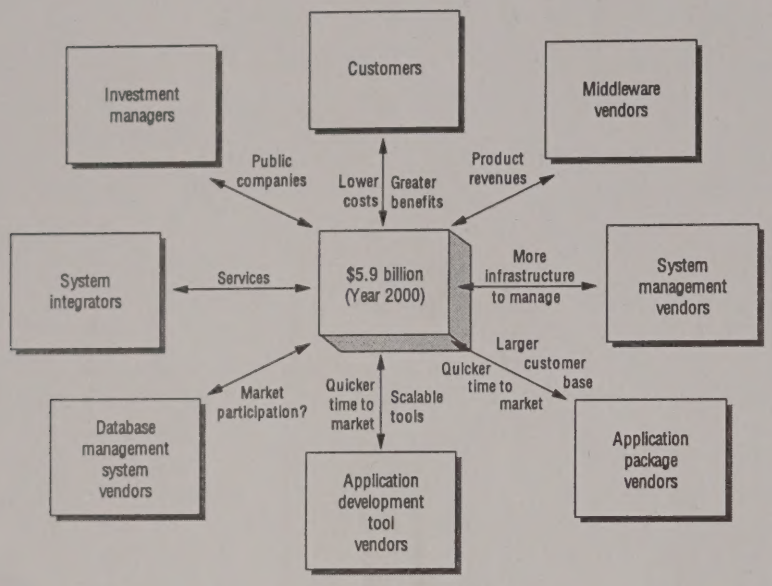
Who Are the Middleware Market Stakeholders?

As part of the constant growth, the shape and constitution of the middleware markets are sure to continuously change and evolve as different players compete and vie for their share of the growing economic pie. A wide variety of IT industry players stand to benefit from participating in the middleware markets.

Middleware Vendors

Obviously, greater customer demand for independent middleware products is music to the ears of middleware vendors. At first blush, it appears there is little more to say about why middleware products vendors should be interested in the market for their products. However, that natural interest should be peaked by the stark reality that the rising tide of customer demand will not treat all of the participating products equally. Some will be more suc-

WHO STANDS TO BENEFIT FROM MIDDLEWARE?



Source: International Data Corporation, 1996

cessful than others. Discovering the correct formulas for success will be essential.

SYSTEM MANAGEMENT VENDORS

As customers increasingly build large-scale applications using middleware, they will find that the runtime middleware environments must be monitored and managed. Very simply, the growing customer use of independent middleware products opens up a vast new marketplace for system management vendors that have traditionally built products to monitor and manage large-scale applications running in centralized operating environments. Even more important, system management vendors that do not evolve their product lines to manage new distributed technologies such as middleware are bound to begin losing customer mindshare.

DATABASE MANAGEMENT SYSTEM VENDORS

Database vendors have most vigorously pursued a product strategy built around embedded connectivity technology. Of course, there are exceptions to any categorization, and the best examples of exceptions here are IBM, Sybase, and VMARK Software.

Sybase has been very proactive in growing a substantial middleware business. IBM delivers a family of independent middleware products, whereas VMARK has a smaller presence in middleware. In the heated competition with Informix, Microsoft, and Oracle, the deliberate strategy to pursue a product strategy founded on the important role of middleware is a potentially valuable difference that a DBMS product vendor can use to differentiate its entire product line and strategy.

IBM, Sybase, and VMARK each have an opportunity to participate in a marketplace that is expected to grow more than 45% from 1995 to 2000 (see *Middleware: 1996 Worldwide Market and Trends*, IDC #11488, July 1996).

APPLICATION PACKAGE VENDORS

Many of the early client/server application packages originally were designed around embedded connectivity technology. In the last year, several prominent vendors have announced plans to redesign future releases of their client/server application packages around independent middleware products.

IDC believes that packaged application vendors are making these redesign decisions for the same reasons that customers will make them. Very simply, independent middleware products do a better job of supporting increasingly distributed applications than connectivity technology that is embedded within another software product. The most tactical need that client/server packaged application vendors face is the need to deliver products that can scale up. Independent middleware can deliver the infrastructure for this upward scalability.

APPLICATION DEVELOPMENT TOOL VENDORS

Application development tool vendors have long recognized the benefits of enabling their toolsets for building distributed applications to middleware. Examples are many and include enablement of application development tools from Dynasty Technologies to distributed transaction processing monitors such as BEA's Tuxedo, Intersolv to Peerlogic's Pipes Platform as well as to the company's own SequeLink, Passport

CUSTOMERS HAVE THE BIGGEST STAKE IN MIDDLEWARE

Naturally, the primary interest group driving growth in the middleware markets will be customers. In essence, customers will increasingly buy middleware products because of the greater benefits they receive when building and operating distributed applications. When customers do not use independent middleware products, the odds are that at some point the deployed applications will fall short of their potential and become hostage to one or more of the following barriers.

VENDOR AND PRODUCT LOCK-IN

One vendor objective when embedding connectivity technology in another product is to make that product more valuable to customers and thereby, to sell more of the product in which it is embedded. The ultimate goal of this good marketing strategy is to deliver product upon which the customer increasingly depends. The objective is not to foster the customer's freedom to buy similar products from a competitor. The latter would be bad business in a market economy.

As a result, customers may pay a price if they become too dependent and grow to use one product beyond the scope of its core competencies. For example, customers locking applications into the connectivity technology embedded within Microsoft's NT operating system may not benefit from the capabilities that a competitor's operating system can deliver. Such a one-size-fits-all decision restricts the ability of customers to deploy application components across competitive operating systems. In turn, these other operating systems may meet requirements that today's NT does not meet. If the same application were built around the appropriate independent middleware, this hurdle would be eliminated.

TECHNOLOGY LOCK-IN

Every vendor's product is designed and built using a small subset of the possible underlying technologies and capabilities. Therefore, vendor and product lock-in naturally leads to technology lock-in. Customers can build distributed applications by using only the connectivity technology embedded within other software products, but using only this embedded connectivity technology will mean that the applications are built in a fashion that narrowly locks the applications into the product, vendor, and technology in which the connectivity is embedded and thereby promises not to deliver optimal benefits to customers.

INABILITY TO SUPPORT CHANGE TRANSPARENTLY

Vendor, product, and technology lock-in will result in brittle distributed applications that are not flexible enough to support, transparently, the type of change called for by a dynamic business environment that must deal with the realities imposed by mergers and acquisitions, business consolidations, and government deregulation. The end result of brittle distributed applications may be costly rewrites.

FAILURE TO DELIVER OPTIMAL CUSTOMER BENEFITS

As a software product designed to be used independently, middleware has a lot going for it. First, the vendor is free to implement middleware on top of an open choice of underlying technologies. Compromises are not necessary because of the "not-invented-here" syndrome. Second, vendors of middleware products are free to focus on delivering only the most robust product that their resources allow. When connectivity technology is embedded within another type of product, that focus may not be as sharp or compromises may need to be made in order to serve other agendas. Third, sleeker and better-performing products may be designed. When connectivity technology is added to an operating system, database manager, or packaged application, the product to which the connectivity technology is added may become more complex and bogged down with code that is adjunct to the product's primary purpose.

For customers, the wide diversity of middleware products means that there are no simple answers as product choices and uses are evaluated. Based on the requirements of the business applications in question, certain products will be a better fit than others. Furthermore, a middleware product that is the ideal fit for one type of application may not be as good a fit for another type. Finally, middleware products will often complement one another; customers will use one product to satisfy part of an application's requirements and another middleware product to satisfy additional application requirements. These conditions all mean that customer interest in middleware is bound to grow as customers evaluate their options for building increasingly distributed applications.

Corporation to Momentum's X*IPC, Platinum Technology to Talarian's SmartSockets, and Texas Instruments to PeerLogic's Pipes Platform and IBM's MQSeries.

Because of the diversity of services that different middleware products provide, IDC expects that application development tool vendors will increasingly enable their tools to build applications that are able to leverage services provided by multiple middleware products. And by giving customers this choice, application development tool vendors can deliver benefits such as the following to their customers:

- **Virtual interface to the customer's choice of middleware options.** First, development tools could leverage multiple middleware products in which each is used for a distinctly different purpose.
- **Freedom to choose the most appropriate middleware services.** Second, development tools may be designed to hide transparently from the developer the differences between similar underlying middleware products, letting the developer make a choice between middleware products in which each is used in a consistent fashion (tailored by the specification of appropriate configuration options).

In turn, independent middleware vendors have the opportunity to partner with tool vendors. By enabling a tool vendor's products to a specific middleware product, that middleware product gains entry/introduction to customer accounts where the tool is used.

SYSTEM INTEGRATORS

Middleware products promise a significant opportunity for system integrators to sell services. For example, there is the opportunity to consult with customers, helping them deploy the system and performance management capabilities needed to properly manage and control the middleware on top of which business applications are built. One products company that clearly sees this customer need for services is Candle Corporation.

A second opportunity comes from providing consulting services to assist customers in designing and installing the best middleware products and distributed application architectures to most appropriately meet the requirements of a growing distributed applications portfolio. A third opportunity for services involves providing custom development and code to tie together diverse middleware products and application systems that must interoperate with one another.

INVESTMENT MANAGERS

Already, the investment community is starting to take an interest in middleware companies that have gone public. A pure middleware play, such as Visigenic Software, is priced at generous ratios in today's market. How well Visigenic's business grows will clearly affect whether the price and ratios at which its stock sells grow or decrease. Other software vendors with a mixed product portfolio that includes middleware, such as Intersolv, are not quite so blessed by Wall Street today.

However, in the future, such software vendors may benefit if robust growth of the middleware markets helps to increase the price and ratio at which their stock sells. Nonetheless, other software vendors, such as Sybase, may leverage the middleware in their mixed product lines to distinguish their strategies from that of the competition. Surely, more than one middleware company that is private today will choose to go public in the future. One future candidate is New Era of Networks, which was featured in *New Era of Networks (NEON): An Emerging Message-Oriented Middleware Contender* (IDC #12059, August 1996).

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Computer Industry Report

THE GRAY SHEET

Global market intelligence on the information technology industry since 1964.

Directions 1997: Follow the Consumer

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April 1, 1997
IDC #13307
Vol. 32, Nos. 2 & 3

When some of the IT industry's sharpest analysts and savviest businesspeople met at IDC's Directions '97 industry briefing session in late March, one name popped up repeatedly: John Q. Public.

Although commercial institutions long have swallowed up IT solutions to streamline their business functions and will continue to devour these solutions in the future, a new and largely untapped market is causing IT vendors to take notice. The consumer market represents billions — perhaps trillions — of dollars of opportunity, but current penetration rates for IT products are low. In the most advanced IT economy, the United States, only about one-third of homes have a computer.

Globally, the consumer market is blossoming. Home users are driving PC growth in many regions, and home use of the Internet is increasing exponentially. By 2000, IDC estimates more than 50 million home users, will access the Internet in the United States, alone.

What is prompting this interest from the home consumer market? Opinions vary. Some industry watchers and players (including Microsoft) believe that the concept of an information society is beckoning users to get online and get involved — thus driving consumer demand for PCs and IT products. Others argue that decreases in the price of PCs and the related technology consumers need to get "wired" have prompted consumers to create the information society themselves — using the technology at hand to its fullest communicative potential.

Whether the information society spawned home IT consumption or whether increased home IT consumption spawned the information society, home consumers worldwide have awakened to IT, and the consumer market is not one that vendors can afford to ignore.

This issue of *The Gray Sheet* provides an overview of the findings released at Directions '97, IDC's 32nd annual computer industry briefing session, with a focus on the growing home market and the technologies that will most influence its development.

IDC International Data Corporation ■ 5 Speen Street, Framingham, MA 01701 ■ (508) 872-8200

THE GRAY SHEET
Associate Editor
Rick Miller

Production
IDC Publications

Editorial Advisers
Donald C. Bellomy Doug McLeod
Lloyd Cohen John Gantz
David Vellante Gigi Wang
Bruce Stephen Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573,
Oxon Hill, MD 20750-0573

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WHAT'S DRIVING IT GROWTH? THE CUSTOMER IS RIGHT.

For the past 30 years, the IT industry has flourished because corporations needed to automate their employees. IT first demonstrated its efficiencies for handling back-office functions, then companies applied IT to front-office applications. Now companies are taking the next step toward a wired marketplace — they're automating their customers.

Why are businesses investing billions of dollars to connect their customers? First, preliminary IDC research shows these companies are finding savings of 50% to 90% in sales, customer support, and distribution costs. Second, the number of wired consumers will continue to grow. Within the next 10 years, the number of Internet users will be measured in billions — amounting to trillions of dollars of opportunity.

This wired marketplace is already under construction. At the end of 1995, 34% of Fortune 500 companies had a public Web site. This percentage increased to 80% by the end of 1996. Smaller companies have followed suit, and IDC estimates about 50% of all U S. companies have a "storefront" in the virtual market. Likewise, the number of users on the World Wide Web increased from 16 million in 1995 to 34 million in 1996, and the number of users is expected to double in 1997.

Perhaps more striking than the growth in numbers of users, the amount of business conducted on the World Wide Web will increase from $1 billion to $5 billion from 1996 to 1997. Industries that address and enable the growing commerce on the Internet will be the sources of the greatest opportunity as the world progresses toward being a true information society.

WHAT ARE THE HOTTEST OPPORTUNITIES?

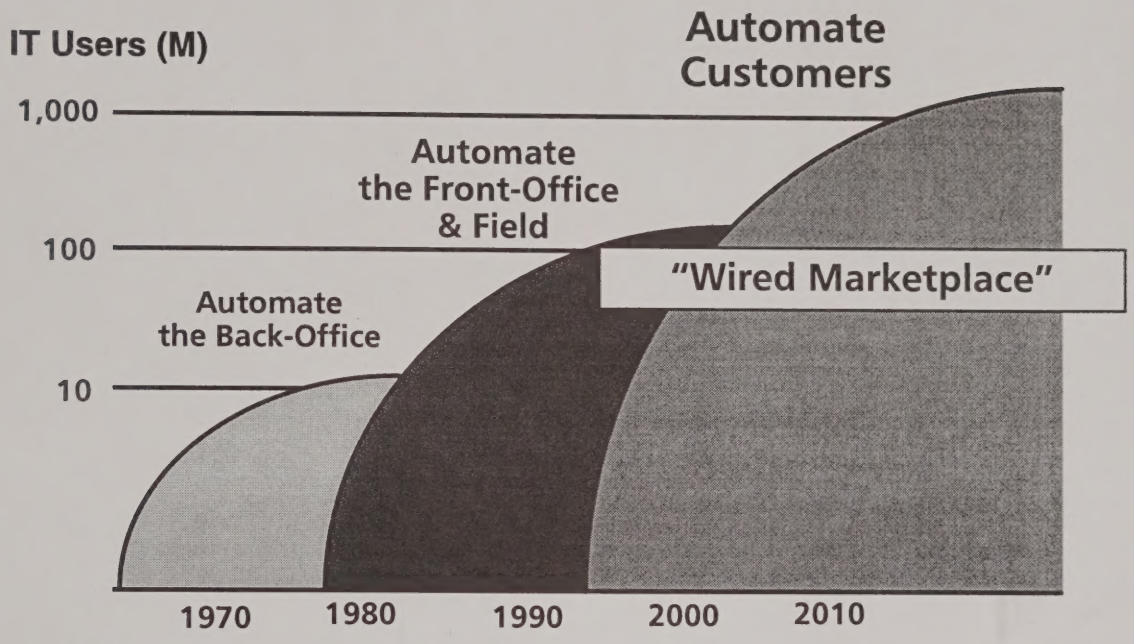
The IT industry as a whole generally is a profitable industry in which to operate, so an opportunity classified as "hot" in this industry really must be extraordinary. IDC classifies hot opportunities as those that meet three criteria:

- They must have growth rates at least twice as high as the industry norm (10.5% compounded annually for the next four years).
- They must be grounded in a market with critical revenue mass — meaning this growth will amount to real money when it's added up.
- They must provide entrepreneurs an edge in the burgeoning wired marketplace.

What makes a "hot" opportunity?

- *Growth rate 2x the standard industry rate*
- *Critical revenue mass*
- *Strategically advantageous for new wired marketplace*

New Driver of IT Growth:
Customer Automation



Source: International Data Corporation, 1997

Internet/Intranet Products and Services

Obviously, the greatest opportunities in the wired marketplace come from creating it, and creating it means enabling the home market. Six markets stand out as essential for enabling Internet/intranet access as well as for applications aside from Internet/intranet access. IDC counted the revenue from sales in these markets in which the primary reason for purchase was to enable Internet/intranet access, hosting, or development.

The six markets are as follows:

- Internet access
- PCs or NCs
- Servers
- Networking equipment
- Software
- Services

In 1996, customers spent about $19 billion in these markets for products whose primary application was to enable Internet/intranet access. (Obviously the spending in these markets for other uses of these products was much higher.) In 2000, these products will garner $92 billion in revenue, which will exceed the $80 billion marginal growth of the overall IT industry that year. In short, the business of building and servicing the wired marketplace is becoming the primary driver of the IT industry.

Networking Equipment

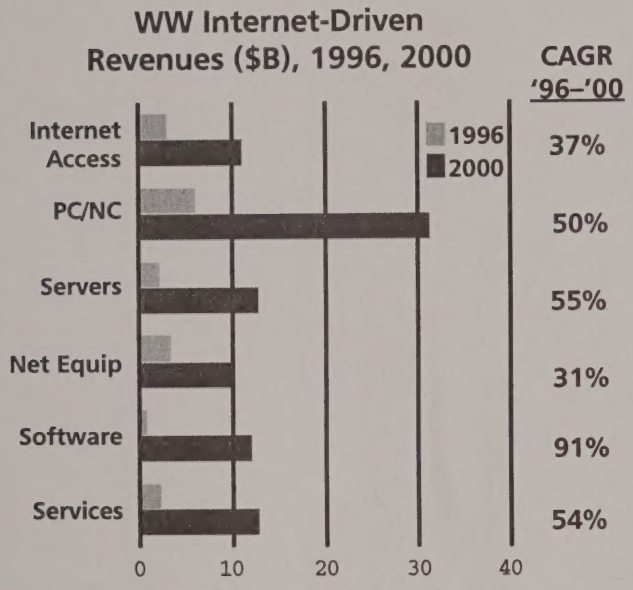
Networking equipment, aside from its role in automating the consumer, is crucial to corporate IT strategies. Subsequently this market is a strong driver of IT growth.

Sales of remote access equipment, in great demand by ISPs like America Online, will grow at 35% compounded annually during the next four years. Another high-growth opportunity that in part is driven by the building of the wired marketplace is the LAN switch equipment business, which will grow 33% year on year for the next four years.

LAN markets and WAN markets are growing more intertwined as the virtual

Internet/Intranet Products & Services

Creating the Wired Marketplace



Source: International Data Corporation, 1997

- Conservative estimate of incremental revenues
- 1996 Revenue $19B
- CAGR '96–'00: 50%
- 26% of marginal IT revenue growth in '96

marketplace develops because the boundaries between the end of the LAN and the beginning of the WAN are becoming harder to distinguish. These markets will see much consolidation, an example of which was 3Com's purchase of US Robotics.

The biggest issue in the networking market will continue to be bandwidth. The virtual marketplace's demand for multimedia and interactive content will drive insatiable demand for bandwidth, and many innovative technologies are coming to market to meet the demand. Gigabit Ethernet is one example of an infantile product in 1996 that will experience tremendous growth in the next four years (319%).

Personal Computers and Network Computers

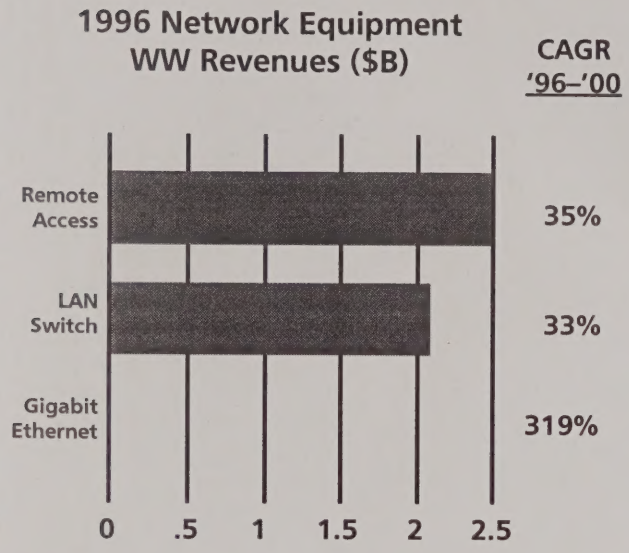
A critical piece of the near-term IT puzzle is the access tool to the network, be it a PC or NC. Great opportunities exist for PCs and NCs in the business segment, especially in portables and PCs equipped to run Windows NT, but the growing penetration of PCs in the workplace indicates that the home segment holds the greatest overall potential. IDC's 1997 Global IT Survey responses indicate the penetration ratio of PCs to desk workers is slightly greater than one to one in the United States.

Home PCs account for 36% of U.S. PC revenue, but only 35% of U.S. homes have PCs. Of the households that do have PCs, one in five of those own more than one PC. By 2000, one in three PC households will own multiple PCs.

Perhaps the most important point to note about home PC consumption is two out of every three PC households use their PC once a day. This is important for many other segments of the IT industry because it indicates that once the PC is in the home it becomes rooted in the family life style. If the home penetration rate increases to 60% or 70%, industries that indirectly profit from PC use will enjoy multiplied success.

The key to achieving 60% to 70% penetration is to push PC prices lower. However, PC

Network Equipment
Building, Widening the Paths



- ISP upgrades driving remote access market
- Corporate LAN growth driving LAN switching
- LAN, WAN suppliers on collision, consolidation course
- IPO, acquisition watch is on

Source: IDC Communications Research Group, 1996

vendors will be unable to reduce PC prices to the magical $500–600 mark on their own and remain profitable. Major chip suppliers will have to make changes in chip design and motherboard design to lower the cost of chip technology, thus allowing PC vendors to lower the overall cost of PCs. IDC believes changes in chip design and pricing are forthcoming in the near future.

The NC market is forecast to grow to $25 billion in 2001. Although this will be less than one-tenth of the size of the PC market in 2001, it will be enough to put pressure on PC makers and chip suppliers to make the design changes necessary to decrease overall PC costs.

Web Site Software

The cornerstone of all the storefronts in the virtual marketplace, for commercial or consumer use, is Web site software. This is an extremely important opportunity despite its market revenue of less than $1 billion in 1996.

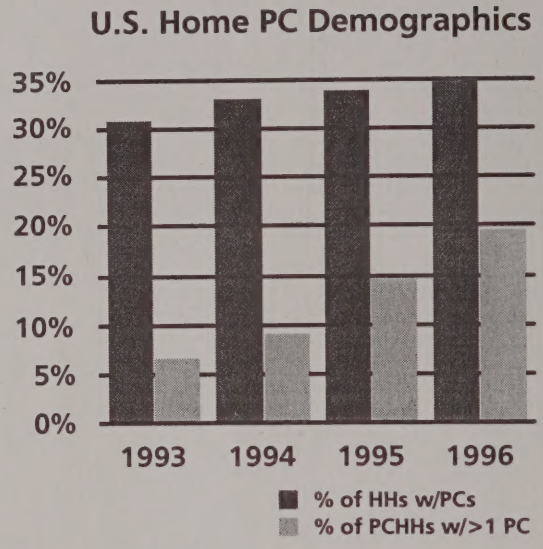
Web site software is strategically important because the next major lock-in software opportunities will come from this industry. Server manufacturers that bundle Web-site software will find great opportunity here also.

Two areas of Web site software that offer lock-in opportunity are commerce servers and groupware. Although these markets still are small, Microsoft, Lotus, Oracle, and Netscape are fighting bitterly to establish market share because of the strategic vantage point these markets will offer in the virtual marketplace.

Another small but important opportunity in Web site software is the Web analysis tools market. These tools help customers measure the return on investment from their Web sites. They track where Web surfers are going on a Web site, where surfers aren't going, what surfers like, and what they don't like. Through the use of these tools, merchants in the virtual marketplace can fine tune their storefronts and maximize their business.

PCs and NCs
Opening Doors to the Marketplace

- **Business growth in Asia/Pacific, portables, NT**
- **Desktop saturation looming in developed markets**
- **Home market presents promise, challenges**
- **NC wild card: $24B in 2000**



Source: IDC/LINK *Global Consumer New Media Survey*, 1997

The Web site analysis software market is forecast to be only $42 million in 1997, but IDC sees indications that point to its potential value in the overall virtual marketplace picture. Microsoft recently purchased Interse, which was a leading company in this field.

*For more information on IDC's top overall growth opportunities for 1997, see Frank Gens' column IDC Executive Insights on IDC's home page: **www.idcresearch.com**.*

New Media: The Fan for the Flame of the Consumer Market

While IT vendors have created, improved, and rendered obsolete technologies for commercial use over the years, many consumers probably have asked, "What does this do for me?"

The advent of a wired marketplace and the progress toward the creation of a true information society answer that question and provide the impetus for consumers to start "getting wired." The wealth of opportunity the consumer market offers provides the impetus for IT vendors to get consumers wired.

However, what will cause the majority of the population not only to accept the personal computer and/or other IT products as useful appliances but make them a focal point of daily routine? New media is a strong candidate to be the cause.

New media is the general term that categorizes interactive, digital entertainment and information. New media content may be Internet based or based in other technologies (Interactive TV, interactive CD-ROMs, and video games are also new media). It goes beyond one-dimensional media like print and two-dimensional media like motion pictures or TV by incorporating interactive multimedia communication to the entertainment or information experience.

What makes new media so different and powerful?

- New media offers something no form of old media can: true interactivity. The individual media consumer is no longer alone. He or she can join new media communities or consume content

that a group created and add his or her own thoughts or comments to the program or discussion.

- Whereas old media is controlled by a publisher, who decides what consumers will receive and how they will receive it, new media offers the consumer flexibility. New media can be edited and altered. The consumer becomes part of the "consumed."
- New media also differs from old because it's digital, not analog, and it's dynamic, not static. Audio, video, and text all combine in a digital multimedia state; consumers access this combination independent of their "receiver" or delivery channel tape (phone, cable TV, satellite, etc.).
- New media's digital delivery permits the blending of the media and the transaction. Whereas old media advertising stimulates future purchasing behavior; new media offers the consumer the ability to purchase in the present.

This new media delivery will have profound effects in the delivery of entertainment, the delivery of information, the delivery of education, and the way people communicate. For example, phone books and maps are more useful in digital format because of search tools that enable users to pinpoint the precise data they want according to the parameters they set. Online games allow users to play with people across the country or across the world.

New e-mail packages offer multiple interfaces that cater to children or adults and offer the ability for users to attach video and/or voice. Communication in cyberspace has advanced to another level through the development of live chat rooms and the introduction of 3D capabilities, which allow users to build avatars – graphical characters that represent the users as they interact in virtual communities.

A virtual community developed by Black Sun provides "smart" ad space. If users are conversing about a particular activity, like skiing, the system is smart enough to display advertising for ski equipment or another related product.

One of the motivating forces causing consumers to buy PCs for their homes is education, and Web sites like that of the Children's Television Workshop (**www.ctw.org**) provide animated graphics and colorful click-through pages. Children can tour a farm with the Tickle Me Elmo character or download pages to color. The enthusiasm kids show for CTW's Web site raises the thought that services can trigger the use of PCs. IDC/LINK's most recent Home Media Consumer Survey indicates supporting education in the home is the number-one reason home users purchase PCs. Also relevant is the finding that 10% of first-time buyers purchased their PC to access online services.

The State of the New Media Market

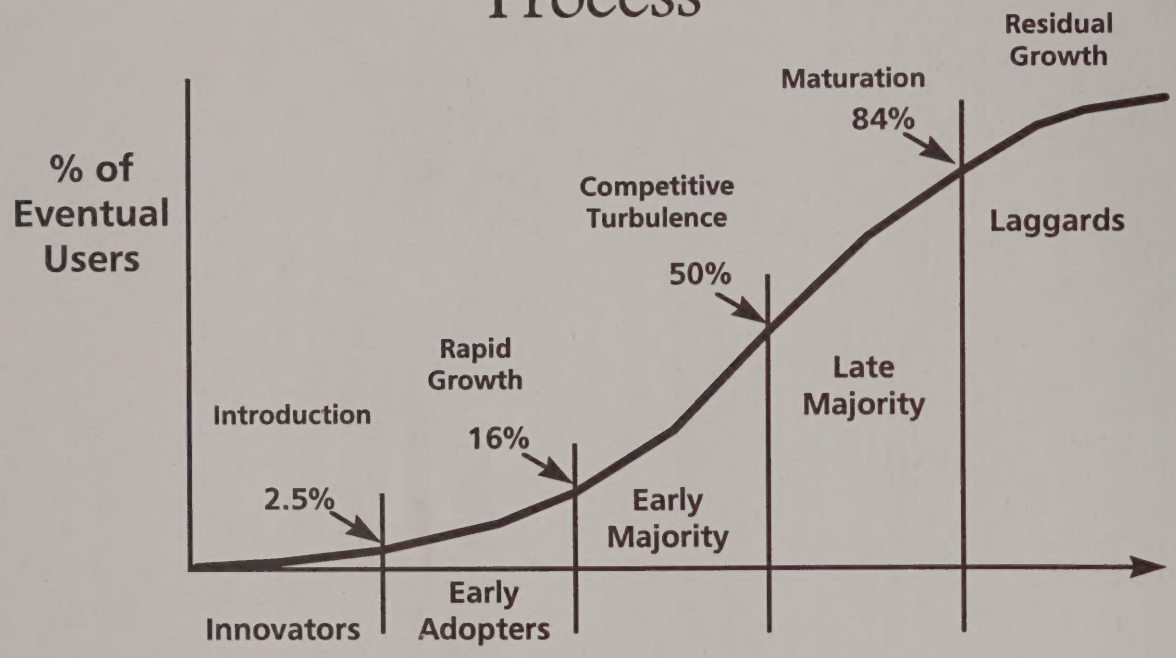
The quality of some of the early new media offerings, combined with the hype that surrounds the Internet and recent multimedia advancements, may cause one to think the market for New Media is maturing. Quite the contrary. In 1996 in the United States, 12 million home users accessed the Internet; that is about 5% of the population. Based on IDC's growth curve, this puts the New Media market in the early adopter stage.

As is evident on the growth curve, the first 2.5% of all adopters of new media (or any new technology) are the innovators, and the next 13.5% are the early adopters. The early-adopter stage is the point in the market where competitive forces have yet to come into play. At this stage, all participants in the market should be developing and nurturing the marketplace rather than viewing each other as competitors. Quality of product is more important than price.

In the next stage of market development, the early majority, price becomes an issue. Nearly 50% of eventual users will have adopted new media by this point, and the market becomes more competitive. Competition increases further in the late majority stage of the market, and the last stage, the laggards, are the remaining 16% of adopters who are just waiting for the technology to fall in their lap.

The shape of the S-curve — or how rapid new technologies are adopted — depends on several factors: how much new learning is required to use the capabilities; the perceived benefit/cost relationship; how easy it is to see what the new technology

Stages of Growth in the Adoption Process



Source: IDC/LINK, 1997

can do (its demonstrability); the ability for users to feel assured that "it" will work for them; its price; and — most importantly — the intensity of need or desire for the capabilities.

IDC/LINK does not expect the new media market to reach the early-majority stage until 1998 or 1999. In 2000, IDC/LINK estimates 53 million U.S. home users will access the Internet. This will be about 21% of the U.S. population.

The big question remains: how many people will adopt the Internet and its new media eventually? Forecasts 30 years into the future are not scientifically valid, but certain factors point to vast adoption. Humans are communicative beasts, and tools that facilitate communication have become widespread (e.g., newspaper, telephone, and television). IDC analysts indicate Internet and new media adoption in the home could reach 80% of the U.S. population.

Currently, the people making use of New Media and online services fit the profile of early adopters. According to the *1996 U.S. Home Media Consumer Survey*, online households have a higher average household income, are more likely to have children, and have reached more advanced levels of education.

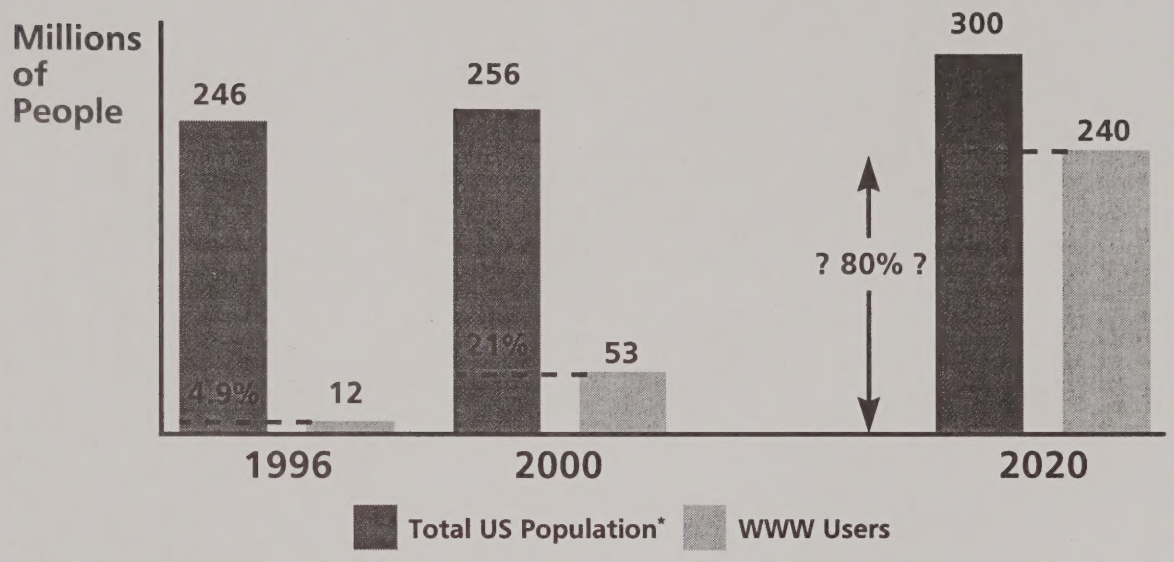
E-mail is the function home online service and Internet users use the most; 62% of *U.S. Home Media Consumer Survey* respondents send or receive e-mail at least once a week, and 46% of all respondents indicated they plan to use it more. Nearly one-third of respondents use online services or the Internet to download software, and 22% said they plan to do this more.

Where Is the Opportunity?

Companies that already have developed new media products or tools will find increasing opportunities as the market begins to develop. Companies that are not pure-play new media producers or online content producers may choose to develop new products in this market, but they may be better off finding a way to partner with new media producers in a way that complements their business.

One example of a potentially lucrative partnership is PC vendors bundling Internet plug-ins with their software bundles.

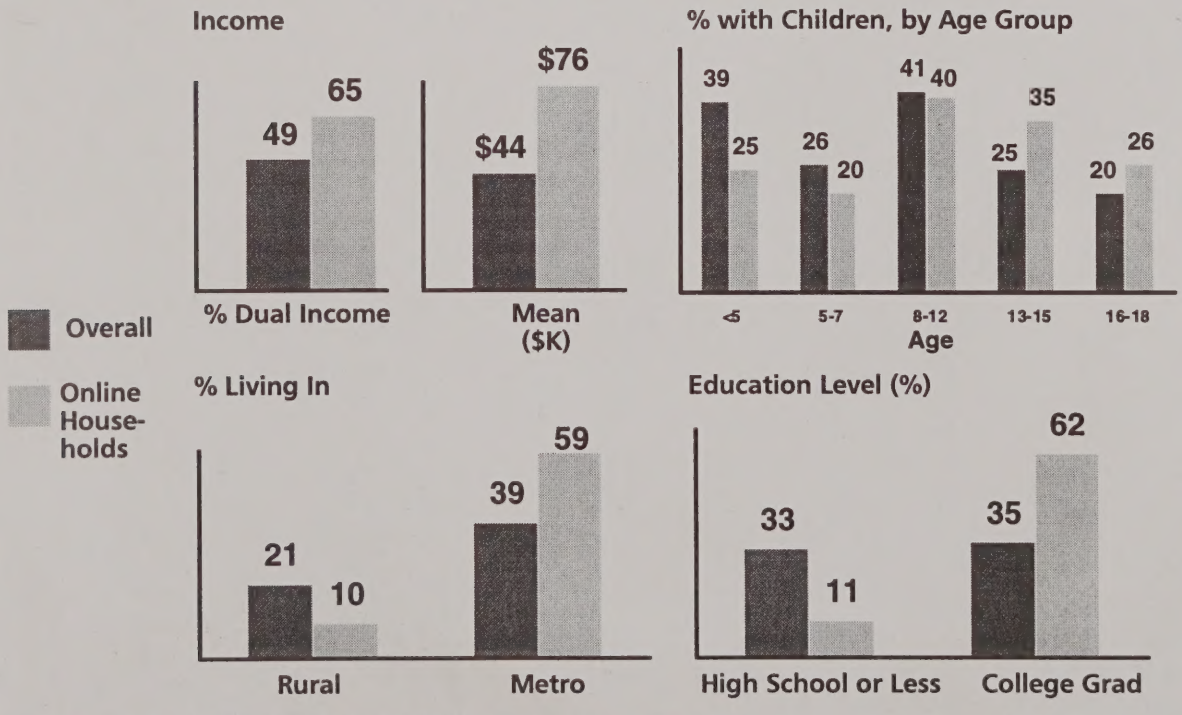
Consumer Use of Internet Is Still in Its Infancy



* Population 5 years and older

Source: IDC/LINK, 1997

Profile of an Online Household



Source: *1996 US Home Media Consumer Survey*

Bundled software with preselected Internet links also marks a unique partnership. Targeting the end-user demand for education and entertainment through preloaded links that eliminate complicated and time-consuming downloads appears to be a wide-open opportunity.

Database vendors should be looking to Internet service providers, online service providers, and even some direct content providers as markets for search tools. End users need robust search tools to access and manipulate the rich content that new media offers.

Peripherals vendors will see increasing demand for digital cameras and digital sound equipment. These products will provide home users with more than just a keyboard as their means of interaction with the digital community, and these products will prove important not only to PC gamers but also to an increasing portion of the online population.

THE OUTLOOK

Is the new media market ready to be a driver of the IT market in 1997? No. However, vendors that wish to reap the benefits of this up-and-coming market need to plant their seeds now. The anticipated growth in Internet and online services use in the near term points to profit in these markets and their related counterparts (namely content). The potential mass acceptance of a wired community and its new media offerings indicates potential for more than just profit; it points to the opportunity for some vendors to be the cornerstones of a cultural transition — to hold the concession on a new way of life.

How long will it take for new media and the virtual community to become as pervasive as the television? It is still too soon to forecast, but when consumers turn to their PC or NC to download the latest sports, news, or weather with no more thought than if they had just picked up their telephone, the vendors that planned ahead will be enjoying phenomenal revenue.

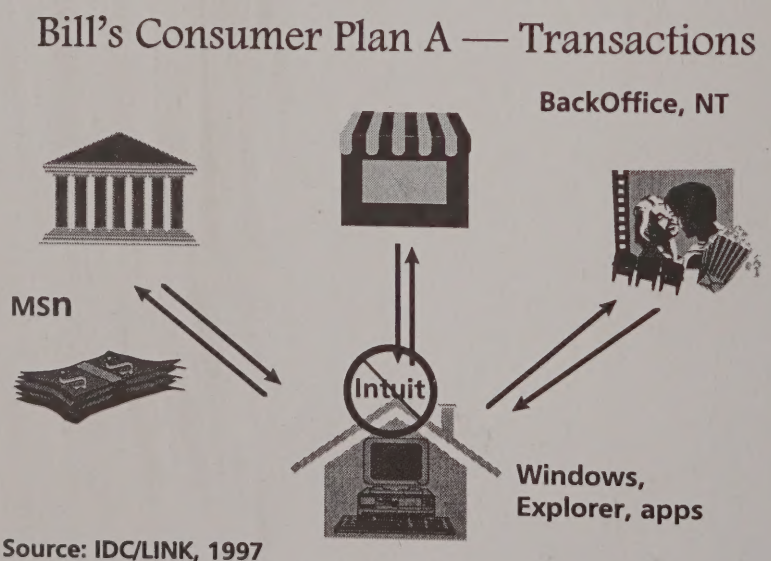
IDC/LINK's New Media Group tracks trends in the New Media market and is developing market size information in the spring, 1997.

WINDOWS TO THE INTERNET: WILL MICROSOFT BE SUPPLYING THE CONTENT FOR THE VIRTUAL COMMUNITY?

Why is Microsoft attempting again to be a prime source of content for cyber surfers? The answer may not be a benevolent desire to promote the social and scientific benefits of the Internet and its new media offerings.

One can't be faulted for thinking that Microsoft is omnipresent in the IT world. It maintains a presence in nearly every growing market, either directly or indirectly. However, the Internet is pairing the world of IT with the base levels of human communication — social interaction, entertainment, and education — and although Microsoft is not expert in any of these fields, it is trying to get a piece of the action in the virtual community.

Back when the term new media was very new, Microsoft was making its first attempt at harnessing the earning potential of the virtual community through the Microsoft Network (MSN) and Intuit software. Bill Gates' plan was to enter the consumer market through Intuit's home banking platform then to make money from the transactions as they were carried out across MSN.



Two large and not-always-reliable entities put an end to this grand scheme. The government decided Microsoft shouldn't take a piece of all the home banking transactions, and the Internet's "open" network precluded MSN's proprietary one.

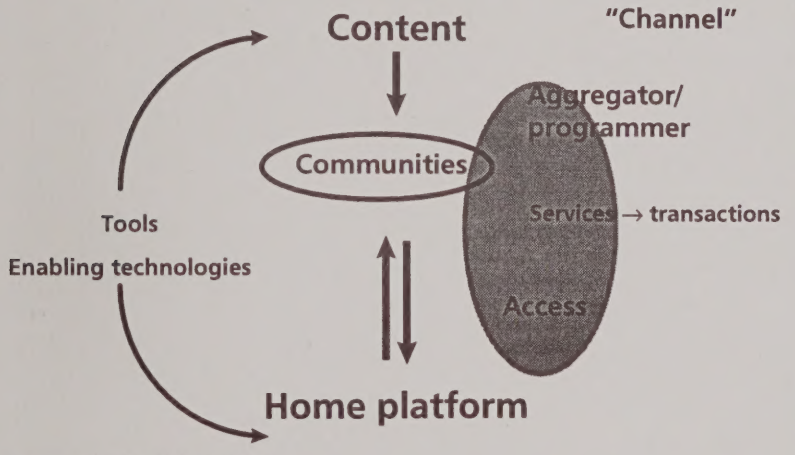
So why is Microsoft returning to the content arena? PCs have penetrated 37% of U.S. homes, and this penetration is growing, but not at breakneck pace. The market for new media consumer products will grow and prosper, but Microsoft's interest in developing this may stem from an ulterior motive. Although high prices and ease-of-use issues contribute to people's decision not to buy PCs, the number-one reason non-owners have not embraced the computer is because they see no need to own one (according to IDC/LINK surveys).

Microsoft sees new media as a way to drive PC sales. If potential home customers can receive old media entertainment through inexpensive, familiar sources — like television and newspapers — why should they purchase a computer for the same services? Microsoft believes home PC penetration will achieve radical growth if PCs offer users access to something they can't get elsewhere. New media is that something.

Bill Gates believes the payoff in consumer computing could be larger than the payoff Microsoft takes from its role in corporate computing. Microsoft aims to get $100 per year, per desktop, in the corporate market. Gates' thinks Microsoft could earn $150 per year, per desktop, in the home computing market — earning revenue from the platform or operating system, access (through MSN), and of course the content. Also, Microsoft has the opportunity to sell content suppliers the tools to make the content, and it has the opportunity to sell advertising.

The new media market fits the model for emerging technologies. In its current early stages, companies like Microsoft deliver complete solutions through a vertically integrated strategy. As the market matures, individual component markets will develop. In the new media market, players can capitalize in four areas: platforms (PCs, NetTVs, and online video game consoles) access and infrastructure solutions, content, and enabling tools for the previous three categories.

New Media Industry Structure



Source: IDC/LINK, 1997

The Stakes

- Consumer software — $3B
- Videogames — $2.2B
- Consumer online access — $4.4B
- Cable TV — $30B
- Broadcast TV (advertising) — $35B
- The movies — $26B
- Gambling, advertising, home shopping

Source: IDC/LINK, 1997

Microsoft gains from an early entry into the new media market because if it sets the technology rules for creating content for the virtual community, it also ensures itself market share when it creates this content.

Products Without a Business Plan

The question at the root of the Internet also is common to new media: how will anyone make money off of it? This is a question Microsoft will have to answer — or will it?

IDC does not think new media and Internet business models should be modeled after television business models and other old media paradigms.

Contrary to the opinions of many in the popular press, IDC does not think new media and Internet business models should be modeled after television business models and other old media paradigms. A business model based on advertising revenue works well for television because of its broadcast form of delivery; television sends the same information to millions of viewers at a time. The Internet does not have this critical mass of users yet, and even when it does, its advantage probably will not lie in its ability to reach these millions of people at once. The Internet and new media offer advertisers the ability to narrowcast — to target small, select groups of people.

Although television loses money with programs like network news, which do more to appease the FCC and government

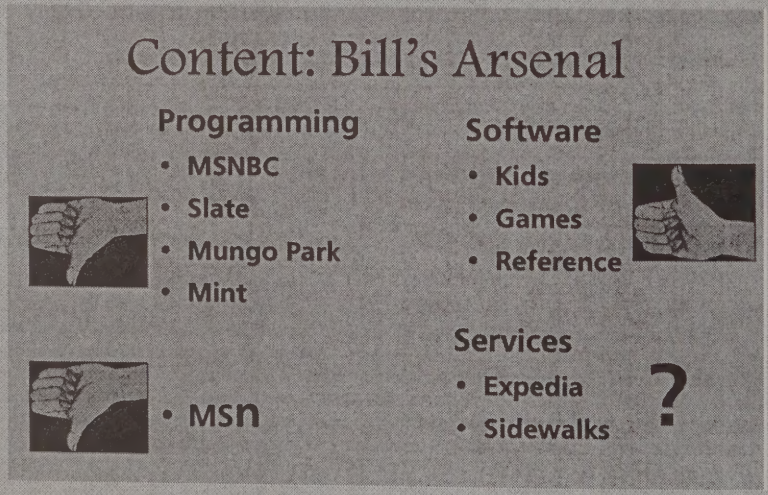
The Toys in Microsoft's Content Chest

What offerings does Microsoft have in the new media arena? Well, not surprisingly, Microsoft sells software. The Microsoft consumer strategy divides the software market into kids, games, and reference products, and the company leads in market share in many of the categories it competes. Flight Simulator and Encarta are two products that sell well year after year. IDC/LINK analysts rate Microsoft's software offerings favorably.

Microsoft is not as successful with its new media programming. MSNBC is basically newsprint on the screen, and Slate and Mint don't receive accolades from analysts. Mungo Park, Microsoft's online travel magazine, received good reviews because it takes advantage of the new medium, but it was the only bright spot in the programming library.

For new media services, Microsoft offers Expedia, a travel service with flight listings, on-line travel agents, and other helpful tips and resources for planning trips and vacations. Microsoft also is rolling out what it calls Sidewalks — an entertainment service that adds reviews and offers cool features like virtual reality views of stadium seating. Sidewalks are developed separately for each city, and the Seattle Sidewalk was due for launch at the writing of this article. The one surprise: Sidewalks are weak at tying advertisements to the listings. Expedia and Sidewalks are too new to garner a rating.

MSN is the channel that ties services, programming, and some of the software together. Its interface is strong, but it is losing the online service battle to AOL by a very wide margin. The network and its programming and services are not making money, and only the standalone software is profitable and increasing market share.



Source: IDC/LINK, 1997

regulators than to earn revenue, the Internet truly can be successful with news offerings. The Internet is, by and large, a means of delivering information rather than entertainment.

The Internet is not meant to be a push mechanism. Publishers or content creators that push information are denying end users the option of interactivity that separates new media from old media. Push technology will have practical uses (e.g., intranets) but it does not optimize the potential of the Internet and won't drive consumers to get online.

How will Microsoft react to the differences between old media business and new media business? Microsoft is very comfortable with the notion of a fat client. Keeping the majority of content on the client and using the Internet to complement this content eliminates some of the complexities of pricing and selling content online. In Microsoft's ideal world, users will buy new media via CD-ROM or DVD-ROM; links to online networks (specifically MSN) and the Internet will provide some of the interactivity.

Fostering this hybrid platform for new media access benefits Microsoft in other distinct ways:

- It reduces the amount of "free" stuff Microsoft has to give away over the Internet.
- It helps solve bandwidth issues.
- It keeps an easy-to-manage business model, as opposed to a pay-per-view or micro-transaction model.

Why go to all the trouble to establish itself as a content king if it eventually plans to hand the business to its partners and contractors? Even if Microsoft is the most efficient media company in the world, it would never be able to maintain its overall margins if media became a big portion of its business.

CHINKS IN THE ARMOR?

The sortie into the consumer market will be profitable for Microsoft if it goes without a hitch. The good news for competitors is that plenty exists to distract Microsoft from the task at hand.

Microsoft will have to find a platform besides Windows to take to the home market. Windows brings baggage unnecessary for home use, and the opportunity for an alternative platform to emerge now exists. Microsoft has been experimenting with new platform technologies, like Windows CE that runs on handhelds, but it has not developed a specific home platform.

Microsoft's may solve its platform concerns with its recent purchase of WebTV. Microsoft bought WebTV for its server technology that makes TV Web browsing simple and fast, and the two companies make an extremely powerful new media combination.

Most importantly, WebTV's user interface is far superior to what Microsoft has for TV integration.

However, Microsoft has other battles to fight. The enterprise

Microsoft's purchase of WebTV is a serious threat to existing online players. It tempers its PC bias for home connectivity and strengthens its content offering too.

market is a big market with which Microsoft must contend, and a full-fledged attack on the consumer market may spread its resources too thin. However, Microsoft is the only company that is trying to address the consumer and corporate markets from a platform point of view and from a content point of view.

Who besides Microsoft is poised to succeed in the content business? PointCast and Marimba, two companies developing push technologies, will enjoy much success – but not in the Internet arena. These companies will find great success with intranets, however, because corporations will find great benefits in pushing information across the network to their employees.

Electronic Arts, the gaming company, has found a mix between developing applications and outsourcing that seems to be working very well. It needs to develop a better online strategy to stay competitive in the new media market, but at the moment the company is executing and performing well.

IBM is attacking the home market through the education segment. It is challenging Microsoft's Encarta encyclopedia product with its joint venture with Worldbook, but it's targeting the children's market

12-Month Temperature Gauge

PointCast	*But near-term corporate*
Electronic Arts	*Pure play, though late online*
Netscape	*Corporate, spun off Navio*
IBM	*Education thrust*
Oracle	*Nearly a nonplayer*
Intuit	*Broken business model*
Apple	*Consumer strategy? What consumer strategy?*

The *real* competition: Disney, Time Warner, AOL, Sony, TCI...

Source: IDC/LINK, 1997

more than the market for general readers. IDC/LINK's consumer surveys revealed the number-one reason people buy a PC for the home is to deliver education, so IBM is tacking a wise course into the consumer market with this strategy.

The real competition for Microsoft in the content arena will come from the established entertainment companies. Disney, Time Warner, AOL, Sony, and the recognized players in the media business will pose the greatest threat to any content ventures by Microsoft.

However, even small vendors have opportunities. Game makers that get their games online and begin building online communities around these games can find great success. The multiplayer functionality of online games will create a lot of demand in this segment, and building online communities around games will offer vendors the opportunity to develop a following of games fans. These followings will be rich user pools into which vendors can sell upgrades or disseminate information.

Microsoft's content strategies are all geared toward the consumer. Vendors that offer corporate content solutions will have an open playing field in the near term.

Big opportunities also exist in the content tools market. Microsoft's original tool set was geared toward its once-proprietary MSN. Now that MSN is not proprietary, there is room for new content tools.

Potential for Partners

Not all vendors need view Microsoft as a competitive Goliath. Plenty of partnering opportunities exist for vendors that understand Microsoft's grand plans for the content business.

Software makers that recognize Microsoft's bias toward the fat client can take advantage. Software content that is based at the client end of the pipe and uses the network only to add multiplayer functions or real-time information updates ties in well with Microsoft's content strategy. Keeping the majority of the content on the client also eliminates bandwidth problems, which remain a big issue with network-based applications.

Microsoft wants to outsource a lot of content for MSN. Opportunity abounds here, but the payoff is unclear. MSN's flat rates don't leave any money for kickbacks to third-party providers, so partners will have to develop an advertising or transaction-based business model.

Microsoft's Sidewalks project may offer the most interesting partnering opportunity. Although Microsoft failed to convince local newspapers to put classified advertising online, many opportunities exist for advertising at the local level. Time Warner is attempting to subvert Microsoft's failed attempt to get the classifieds by partnering with local radio and television stations.

The Bottom Line for Microsoft

Microsoft will not win all its battles in the new media war. MSN will be profitable well before Bill Gates' predicted 2001 date, but Microsoft will struggle in other fronts. (The gloom and doom portrayal of MSN is primarily to scare off competition from the Disneys and Time Warners out there; in fact, as this article went to press, Disney signed an exclusive deal to work with MSN.)

In the end, content will prove too cumbersome for a company accustomed to high margins and little corporate fat. Microsoft's greatest success from its

adventures in content will stem from bringing more home users online (by whatever platform they choose to use) and developing software and operating systems for these millions of new users.

More information regarding Microsoft's content model is available through David Card and the New Media Group at IDC/LINK.

THE PC IS KEY

Although interactive videogame consoles, smart phones, and other electronic devices will all vie to be the platform users choose to reach the Internet, the PC will remain irreplaceable — for Internet access in many cases and for other applications in nearly all cases.

Microsoft believes the mass market will embrace PCs if IT vendors give it new media, shop-at-home convenience, and other reasons to buy them. Contrapuntists argue that lower price points combined with other factors are driving PC penetration, which in turn drives online use and new media demand. Whichever the case, one fact remains: the PC is key to developing the budding information society.

The IT community's growing attention to the consumer market is justified. In the United States, 39–40% of PCs shipped go to home users; 30% of worldwide PCs go to the same segment. In emerging markets like Asia/Pacific, this segment will grow dramatically.

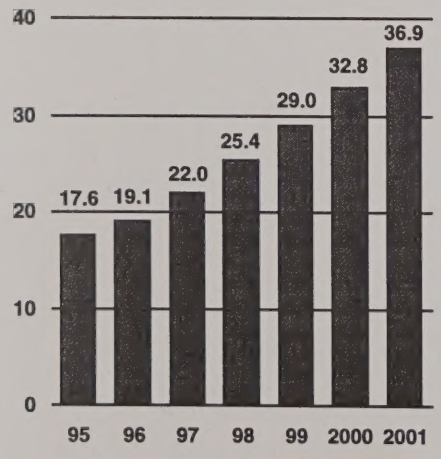
Many enticing technologies are being released in 1997, and Intel's massive promotion of the MMX chip has already led to an increase in consumer PC sales. Digital cameras are the hottest new peripheral, and this technology may bring a new segment of home users to the marketplace. The digital camera provides amateur photographers an inexpensive method of storing, transporting, and manipulating photos — ideal for designing Web pages and enhancing e-mail.

IDC forecasts the consumer market will be spurred by price cuts in 1997. Intel will use some of its considerable margin to cut prices on processors to promote PC demand, and Cyrix and AMD will keep the pressure on Intel with more competitive offerings than the processor industry has seen in quite some time. The drastic decrease in memory prices in 1996 still is affecting PC prices, and IDC forecasts further price erosion in this market. Disk drives also will continue to drop in price.

For the first time, the PC market will see viable products below the $1,000 price point. Packard Bell will release a system for about $800. First-time

Consumer Desktops

Unit Shipments (M)



Source: International Data Corporation, 1997

- **Growth 97/96: 15.1%**
- **CAGR 97-2001: 13%**
- **Share: 28% —> 28%**
- **Leaders: Compaq, Packard Bell, IBM**
- **Key Trends**
  - **Fancy multimedia**
  - **Lower price points**
  - **Internet access**

buyers and repeat buyers should respond to this offering. In the United States, consumer confidence is at a seven-year peak.

Be it to join the virtual world, to take advantage of falling prices, or to implement the latest multimedia technology and peripherals, consumers will buy more and more desktops worldwide through 2001. IDC forecasts the 1997–2001 growth compounded annually will be 13%, and consumer desktops will continue to hold about one-third of the worldwide PC market.

A Macroscopic View

Worldwide PC shipments for 1996 were 69 million units, up from 58 million units in 1995. IDC expects 117 million units to ship in 2000, and undoubtedly consumer sales will stimulate this growth. Small businesses that are computerizing for the first time are driving present sales, and medium-sized and large businesses are in the midst of upgrade cycles and transferring to more intense applications. Medium-sized and large businesses are beginning to adopt Windows NT.

While the consumer market is entering a period of strong growth, the corporate market is enjoying growth as well; however, this growth is leveling off in some regions of the world because of market saturation. The United States represents 38–39% of the world market for PCs; its share will slip to 35% by 2001. The penetration rate for PCs in the United States is about 40% – more than double the next-highest rate (that of Western Europe). In saturated markets like the United States, new uses for PCs will drive sales in the consumer segment and in the business segment.

Although Intel's MMX may be prompting more buyers in the consumer market, business users are continuing to purchase Pentium- and Pentium Pro-equipped machines. Pentium II, the chip formerly known as Klamath, will have a delayed effect on the market because its initial price will be rather expensive, and it doesn't offer a tremendous boost in performance compared with today's technology.

Meeting Consumer Needs: What Works? What Doesn't?

If the consumer market offers such vast opportunity, why do vendors show any hesitation toward building a portfolio of consumer products and selling, selling, selling? Because despite the opportunity, it's easy to get burned.

Consumers are finicky, and in response to this trait, vendors in the past have tried to develop product lines with feature sets aimed directly at customer demands. Addressing the needs for gamers, for family users, and for general-purpose users causes problems in the channel because dealers and distributors don't want to carry 17 different SKUs for one brand of PC. IBM had a failed attempt at segmenting its consumer PCs, and Acer's attempt last fall wasn't much more successful. The current trend is to avoid segmentation and offer low-end, midrange, and high-end models.

Consumers like features and functions that offer them a distinct capability they would not have enjoyed without the benefit of technology, but these offerings must be reasonably priced. The digital camera is a prime example. Filmless photography has been on the market for some time, but it hasn't been a big hit. Digital cameras offer better quality photos and their prices are reasonable enough for consumer acceptance. More than 30 vendors, a mix of camera makers and electronics vendors, are releasing digital cameras this year. Meanwhile, increased multimedia capabilities on PCs make it easier for users to manipulate photographs.

Other peripherals like printers are proving cheaper and more versatile. Printers that print photographs used to be expensive and specialized. Now some regular color printers come with cartridges and special paper for printing photos, and these printers are available for around $300.

Consumers can see (literally and figuratively) the advantages that new features like digital photography offer, and tangible benefits encourage people to buy.

Economic patterns also play a role in the world's PC markets. The United States continues to enjoy growth, albeit slowing slightly, because business investment is growing at double the rate of the overall GNP, which is also growing nicely. Unemployment is low. The converse is true for Western Europe, where its largest country (Germany) is suffering its highest unemployment since before World War II. PC growth compounded annually for the United States and Western Europe, 1997–2001, is 11% and 8%, respectively.

Japan and Asia/Pacific are two of the fastest-growing regions in the world (behind Latin America) at 17% and 20%, respectively. The Japanese economy has slowed, as shown by a plunge in the yen and a drop in the Japanese stock market, but the PC market has been booming since 1995. This growth will be difficult to maintain, but Japan is generally healthy. The rest of Asia looks even better; China is the fastest-growing large economy, and growth in the remaining countries is strong. Penetration rates for Asia (excluding Japan) are about 1%.

The Smart Vendor Approach

PC vendors need a combination of elements to continue to thrive in their increasingly competitive market. Size matters. Large vendors get better treatment from component suppliers. Geographic diversity is important and will become more important as the balance of the world market shifts from the United States to other regions. Good geographic balance allows vendors to take advantage of the markets that are hot while they ride out the markets that are not. Equally important is a good product mix; vendors must balance their offerings with high volumes of low-margin desktops and lower volumes of high-margin products like servers.

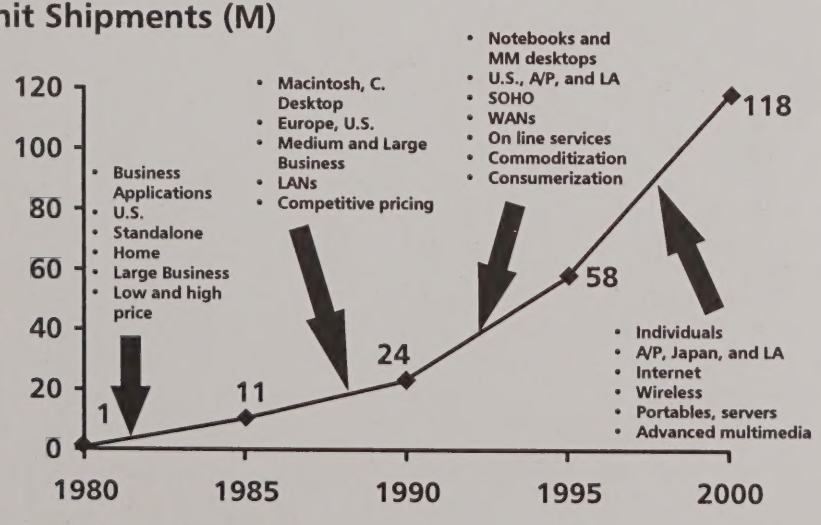
The business model is critical for success. Vendors must select markets, channels, pricing, and financing policies that constitute a coherent strategy. Dell proved this point convincingly in 1996. The companies that have failed to pick a strategy typically have failed in general.

How In Is Thin?

Thin clients, or network computers (NCs), have drawn a lot of attention in the past 12 months, and Microsoft's chief adversaries would have one believe that the PC is less than key for joining the information society, it's unnecessary weight.

Stagnancy in consumer electronics markets, even the slow-

Worldwide PC Volume: 1980-2000



Source: International Data Corporation, 1997

ing growth rates for PCs (although the rates are still quite healthy), prompted the development of the NC — and even though it still has its limitations, the NC is posing enough of a threat to the Wintel machine to have an influence on pricing trends in the short term.

Network computers come in two flavors: enterprise network computers and information appliances. Enterprise NCs are similar to PCs but exist only on a network and deliver information and perform tasks via an intranet or the Internet. Information appliances, also classified as thin clients, are less similar to PCs and consist of smart phones, net TVs, and interactive video game consoles.

NCs require most if not all computing functions to be placed on the network, and this is a source of great debate in the IT community. NC proponents and opponents alike have concerns about bandwidth limitations and about the willingness of end users to take their processing power and put it on a public or semi-public server.

The consumer market brings its own enigmas. How much money will home users be willing to spend on NCs? What utility will they expect from these machines? How easy to use must they be? As in the corporate segment, bandwidth is a concern too.

An NC Society?

How prominent a role will the NC play in ushering in the information society? The first answer to this question resides in the NC's potential customers. IDC forecasts the business market to be the early opportunity for network computers along a number of different lines — most significantly for terminal replacement. NC clients take advantage of tapping into that installed base of terminals. In addition, they could be applicable to PCs with terminal emulation, and for enabling groupware, for running Lotus Notes environments over the Web, and so forth.

In the consumer space, vendors should target a couple of different types of customers. On the one hand, sophisticated customers or multiple-PC owners may want to implement a part of the PC or the Internet experience for little cost. On the other hand, less experienced users are perhaps looking for a simpler, low-cost solution to implement the devices. IDC also forecasts opportunities in education to put NCs in classrooms, dormitories, and libraries. From an information display perspective, we envision capabilities to put the products into information kiosks and other public display areas.

The second indication of the NC's role in the information society is the simple math: how many NCs will sell and to whom? IDC forecast data indicate that Net TVs will have the highest volume of all types of NCs — globally and in the United States. The Net TV "viewing metaphor" will be easily accepted by customers. However, the problem lies in consumer expectations. It will take significant bandwidth to provide the fast-paced entertainment that users are accustomed to from television.

Vendors involved with WebTV (Sony, Phillips, etc.) will lead the Net TV market, and major television manufacturers will jump in, as well as the multimedia conglomerates and the cable TV providers. New high-end TV can incorporate a lot of technology in storage, displays, and even I/O functions. Over time, entertainment PCs and TV-centric products will likely blend.

The steady adoption of Net TVs indicates the NC platform will play a prominent role in the construction of the information

Customers for Network Computers

Business
- Terminal replacement
- Transaction workers
- Groupware enablers
- Lightweight PC users
- Suppliers (business-to-business)
- PC w/ terminal emulation

Consumer
- Multiple-PC households
- Emerging geographies
- Service, content and IS providers
- Technophobes
- Technophiles
- Price-conscious users

Education
- Classroom, library, dormitory

Other
- Kiosks
- Information terminals
- ATMs
- In vehicle

Source: International Data Corporation, 1997

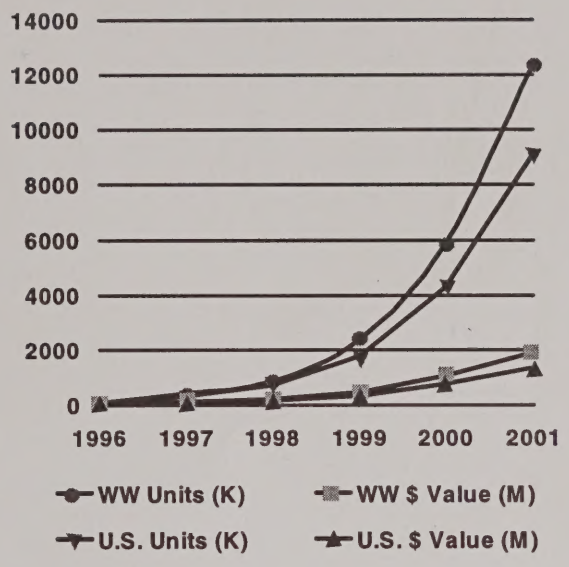
Net TVs

Accelerators

- Low-cost of set-tops
- Familiar metaphor
- Room for expanded functionality

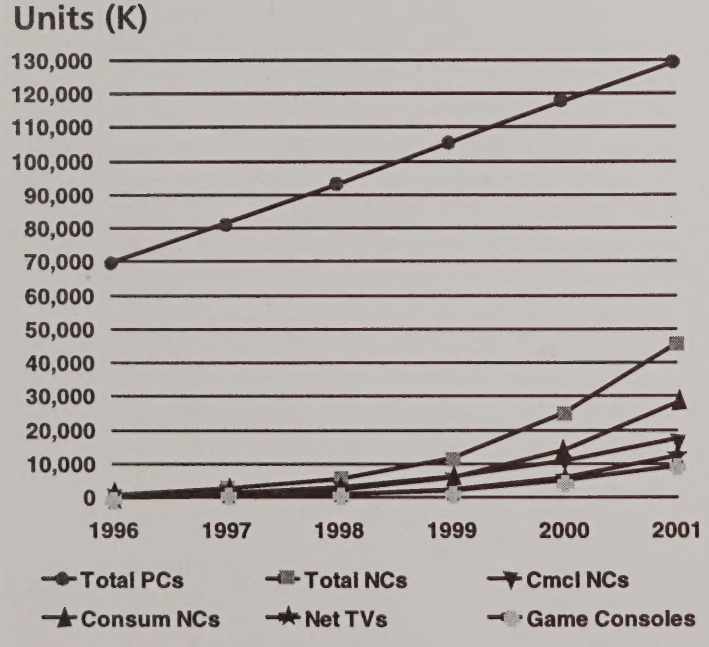
Inhibitors

- High expectation level
- Bandwidth
- New viewing metaphor



Source: International Data Corporation, 1997

NC Unit Forecast



- PC to NC ratio
  - 30 to 1 in 1997
  - 2.85 to 1 in 2001
- Consumer NC crossover in 1999
- Net TVs biggest NC in 2001, followed by game console

Source: International Data Corporation, 1997

society because its primary target is the home user, and its primary function is to get people online. Consumer NCs will outship commercial NCs in 1999, but they will not prove to be the most lucrative segment of the NC market. Commercial systems will have higher average system values than machines built for the price-sensitive consumer market and will continue to lead in revenue.

Woe Is PC?

Just how worried should Microsoft and the fat client world be because of the up-and-coming thin client? NCs will not take the place of PCs anytime soon, but by the turn of the century they will be making their mark in the marketplace.

PCs outship NCs by a 30:1 margin at present. This gap will shrink to 3:1 by 2001, but that accounts for the rise in consumer products – games consoles, smart handhelds, and Net TV. The scenario is the same for revenues. The PC-to-NC revenue ratio is 77:1; this will shrink to 11:1 in 2001, but the dollar disparities are significant. The NC market will be about $25 billion and the PC market will be $275 billion.

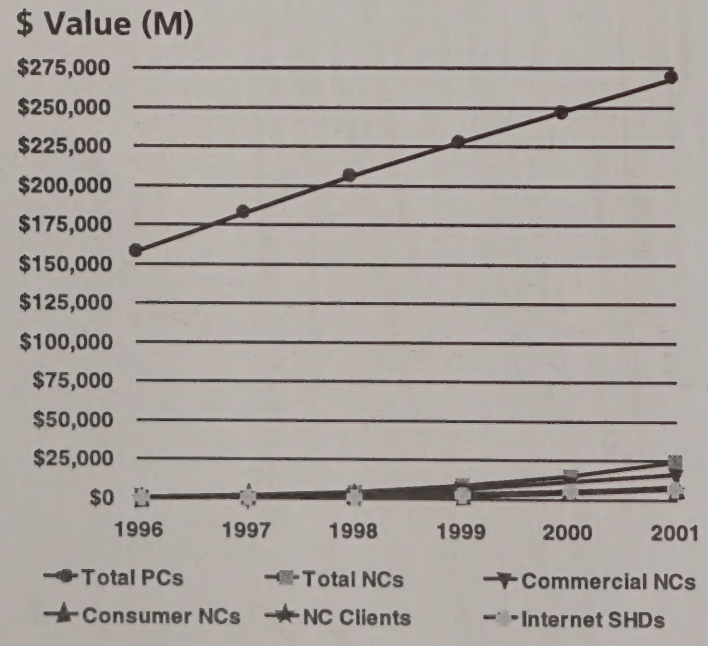
The amount of publicity surrounding the NC market in the past 12 months is a strong indication that PC manufacturers feel threatened by the NC. Major PC players are retaliating to this threat by cutting prices as much as margins allow. Most major vendors have consumer offerings with acceptable feature sets (CD-ROMs, extra storage, etc.) available for $1,000. Prices in the commercial market are deteriorating also.

Yet despite the hype, the NC market remains at a concept stage, and much of its major growth will not occur for three to five years. Until bandwidth issues pan out, consumers will be slow to adopt — and if the consumer segment of the NC market fails to materialize, funding for the entire NC market could slow to a trickle. Broad distribution is key, and the NC market could benefit from a business model developed after the cellular phone market — free equipment in exchange for service revenue.

As with other technologies yoked to the development of the information society, the degree of the NC's success ultimately will depend upon the yet-to-be-measured combination of consumer demand for connectivity and the consumer acceptance of the cost of this connectivity.

Comprehensive PC and NC information is available through IDC's Personal Systems Program.

NC Revenue Forecast



- **PC to NC $ ratio**
  - **77 to 1 in 1997**
  - **11 to 1 in 2001**
- **Commercial NCs lead consumer throughout**
- **Biggest NCs: NC client and Internet Smart Handhelds**

Source: International Data Corporation, 1997

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Computer Industry Report

THE GRAY SHEET

Global market intelligence on the information technology industry since 1964.

The Year 2000 Project: Management Has Heard the Message

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March 15, 1997
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Vol. 32, No. 1

The year 2000 date problem could be the source of a major hangover on the morning after the turn of the century, but most companies have stocked their medicine chests.

Although the popular and trade press have been touting the potential for mass chaos on January 1, 2000, most corporate IS departments have already undertaken projects designed to remedy the calendar problems caused by the transfer to the next millennium.

Despite doomsayers' projections of lost bank records, insurance policies, and other date-related data at the magical 1/1/2000, IDC's *1996 Y2K Survey of Executives* finds that most corporate decision makers believe they have the problem under control.

Certainly the year 2000 problem is big; it is the biggest maintenance problem ever to hit IS departments, but some people should be more concerned than others. People who should pay year 2000 the most mind, for good reasons or for bad, are as follows:

- **CIOs/IS managers** — Because the charge to provide a seamless transfer from this century to the next is theirs, IS executives should (and do) express the most concern over the issue. After all, if these managers don't succeed, they can expect dire professional consequences.
- **Executives in date-related industries** — Executives in insurance-, banking-, and finance-related industries are more concerned about the issue than are executives in industries such as manufacturing and communications.
- **Leaders of midsize corporations** — In IDC's survey, corporations defined as midsize ($500 million to $1 billion) reported the most problems in addressing the project.
- **Services/software vendors** — Over the 1995–1999 period, the year 2000 project will generate nearly $37 billion worth of opportunity for these vendors.

THE GRAY SHEET
Associate Editor
Rick Miller

Production
IDC Publications

Editorial Advisers
Donald C. Bellomy, Doug McLeod
Lloyd Cohen, John Gantz
David Vellante, Gigi Wang
Bruce Stephen, Frank Gens

President and CEO, IDC
Kirk Campbell

Chairman, IDG
Patrick J. McGovern

■

Editorial Inquiries
Rick Miller, (508) 935-4530
rmiller@idcresearch.com

Other Inquiries
Customer Service, 1-800-217-9828

IDC Newsletters, P.O. Box 573,
Oxon Hill, MD 20750-0573

■

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IDC administered its *Y2K Survey of Executives* to three ranks of corporate decision makers — CEOs, CFOs, and CIOs/IS managers — and found varying levels of concern. The CEOs and CFOs, who look at the year 2000 problem in the context of overall business operations, did not attribute the same level of concern to the issue as did CIOs, who see year 2000 as a potentially career-limiting project (and rightly so).

The three groups of executives *did* share a concern about the greatest potential damage if the year 2000 problem is not completed on time. CEOs, CFOs, and CIOs most frequently ascribed the damage of failed year 2000 projects to the customer, estimating that this business relationship would suffer more than the companies' business partners, competitive positions, or financial health.

These findings begin to substantiate IDC's more low-key approach to viewing the year 2000 dilemma. Although people far removed from the year 2000 issue (the popular press) may see the project as a Herculean task in its complexity, and although people quite close to the project (IS) may see it as a huge monkey on their backs because of the increased workload it brings, those responsible for putting the problem in perspective with regard to maintaining business operations (CEOs) see the issue as important, potentially damaging, but most pertinently — solvable.

THE VIEW FROM THE TOP

IDC posits the average IS budget to be about 2% of the overall operating budget for large corporations, based on responses to the *1997 Global IT Survey*. Year 2000 projects may force these budgets upward by 13%. To a CEO or CFO, however, the notion of increasing a small sliver of a big pie by only 13% is not enough to overshadow larger financial concerns. Increasing IS's 2% share of the total operating budget by 13% increases overall spending by less than 0.03%.

Thus, from a bottom-line perspective alone, it is easy to see why only 33.7% of corporate heads rated the year 2000 problem as a major business issue. More CEOs in the survey sample (49%) were concerned about how a failed year 2000

CORPORATE DECISION MAKERS' PERCEPTION OF THE YEAR 2000 DATE PROBLEM

Management Perception	CEOs (%)	CFOs (%)	CIOs (%)
A major business issue	33.7	38.5	49.3
A minor business issue	45.3	41.7	31.7
A nonissue	21.1	19.8	19.0
N =	95	96	302

Source: IDC's *1996 Y2K Survey of Executives*

project would affect their relationships with their customers.

The concern for customers is a good reflection of the ethics of the CEOs in the survey sample but perhaps also indicates concerns about legal implications. The CEOs were split roughly evenly among those who believe companies could be legally responsible for year 2000 liabilities (34%), those who believe companies could not be responsible for year 2000 liabilities (36%), and those who answered, "I don't know" (30%).

A striking finding from the surveyed CEOs, whether motivated by pending legal concern or merely good customer service instincts, is that although the concern for the customer was the foremost issue, *only* 49% of respondents mentioned it. Thus, more than half do not see the impact on customers as a major concern, further substantiating the theory that CEOs feel the year 2000 problem is under control.

A slightly larger percentage of CFOs than CEOs expressed concern about the year 2000 problem's impact on customers, and CIOs were more concerned than either CFOs or CEOs about the impact on customers (and the impact on other business relationships).

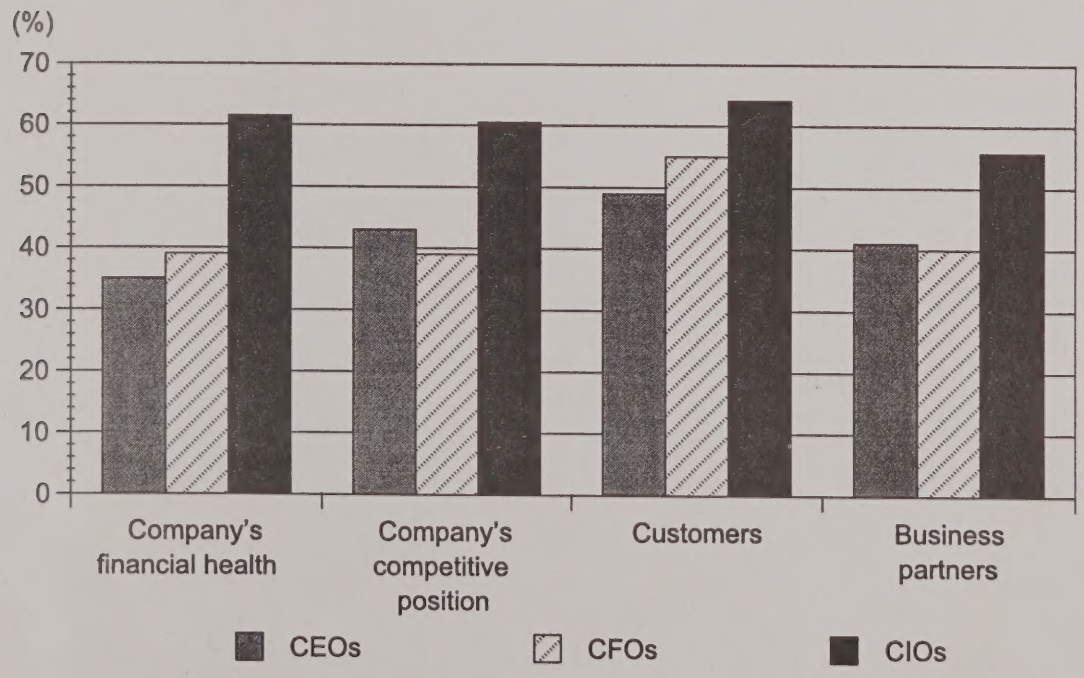
The group of CEOs who responded to this survey may have expressed less concern about the year 2000 issue than one might expect, because 15% of the respondents had either finished their projects or believed that they did not need to make year 2000-related changes. IDC is concerned that some of the respondents who indicated that changes were not necessary may not realize that indeed they do have changes to make.

What Is the Year 2000 Problem?

The year 2000 problem is the calculation problem many computer systems will face when the six-digit date code changes from 123199 (December 31, 1999) to 010100 (January 1, 2000). Many applications will develop errors or cease to function when the calendar date becomes numerically smaller than the date that preceded it.

Legacy code — data and code that were developed as long as three decades ago — has been handed down from one generation of machine to the next.

Corporate Decision Makers' Perceptions of What Will Be Affected If the Year 2000 Problem Is Not Addressed



Note: Multiple responses allowed.
Source: IDC's *1996 Y2K Survey of Executives*

Much of this data, such as insurance and financial records, remains valid and will still be so at the turn of the century. The problem for IS departments is to keep these records valid and able to be manipulated after the big date change.

For obvious reasons, IS managers in banking-, investment-, and insurance-related industries have the biggest tasks because dates play a crucial role in mission-critical applications. Communications and utilities companies are less dependent on dates in day-to-day business functions, and IDC judged manufacturing companies to be the least reliant on dates as part of the business process.

Ways to Approach Year 2000 Issues

IDC sees four basic project strategies that companies can use to address the year 2000 problem: renovating code, replacing software with year 2000-compliant software alternatives, rewriting present applications in more modern programming languages, or completely reengineering the business process. Companies are likely to use a combination of the four strategies, focusing on one and supplementing efforts with one or more of the others.

Code renovation is the easiest fix and is the quickest to implement but offers no return on investment to the information system. With this solution, programmers survey the extent of the code problem, fix the code, and test and reinstall the modified code to the original system. Renovating code is the most popular solution to the year 2000 problem: 40% of IS managers indicated it to be the primary solution they implemented.

The next popular solution is to replace existing software applications with year 2000-compliant packages; 33% of surveyed companies elected to pursue this option.

Some companies (13%) have elected to address the project primarily by rewriting their mission-critical applications in newer languages, thus addressing the year 2000 problem while gaining more functionality.

The most expensive and time-consuming approach to the year 2000 problem — but one that offers the greatest return on investment — is business process reengineering (BPR). BPR goes beyond renovating code and changing software applications; it reorganizes business functions by combining and automating processes to increase overall efficiency. About 14% of the IS managers surveyed said BPR was their primary solution to the year 2000 problem.

Many companies (38%) are approaching the year 2000 project as a unified whole. Banks and insurance companies tend to break the project into multiple subprojects; the insurance industry actually averages 35 separate projects per company.

How Complete Are Year 2000 Projects?

In IDC's *1996 Y2K Survey of IS Executives*, we asked CIOs to name the quarter in which they started work (or will start work) on their year 2000 projects. Although some companies got an early start (prior to 1995), the majority of companies started in 1995 and 1996. The largest percentage of companies (20%) started in the first quarter of 1996.

Less than 19% of companies waited until 1997 to start their year 2000 projects, but at the writing of this issue, only 6% have yet to start.

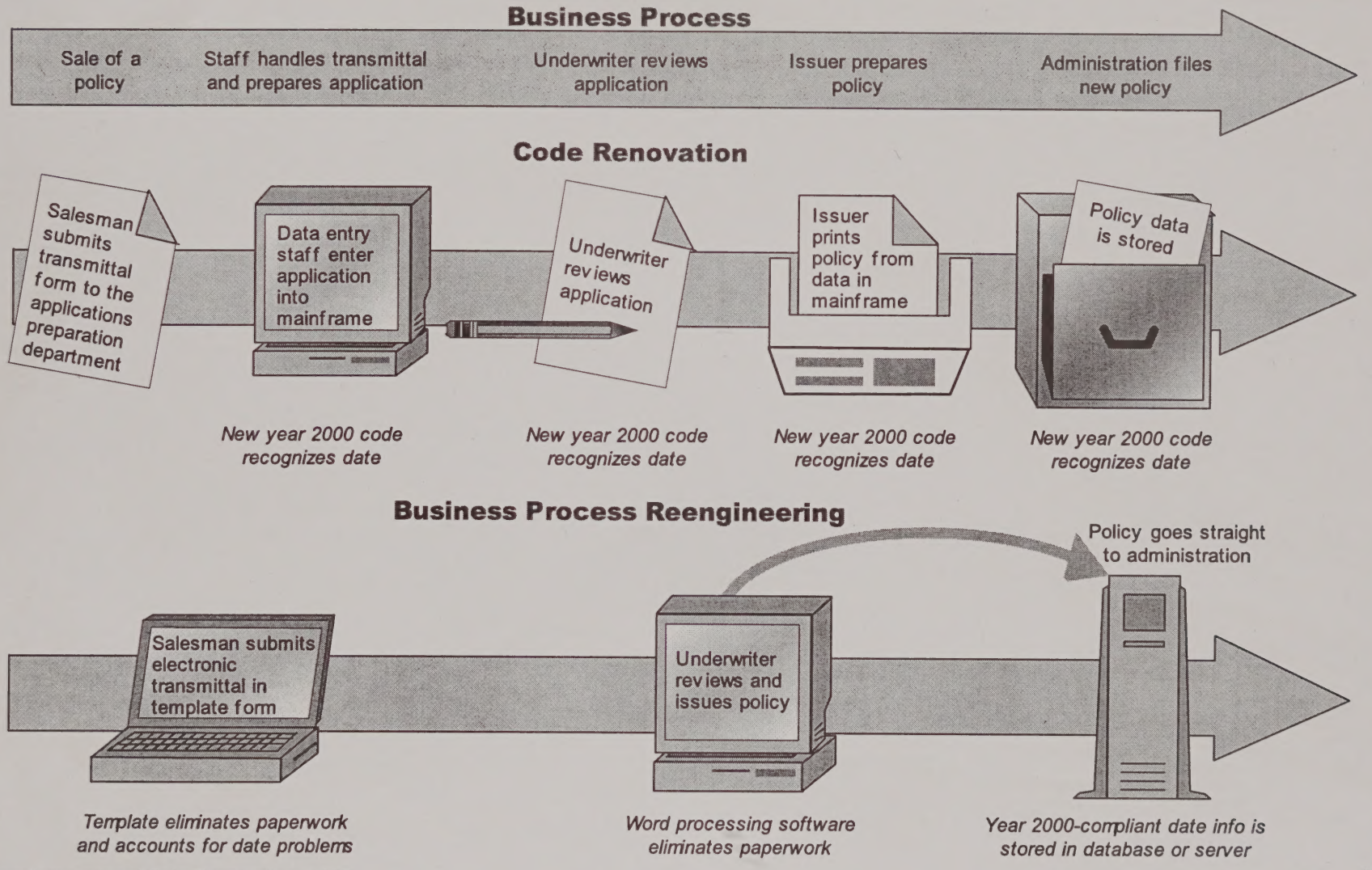
Year 2000 projects, on average, take about 27 to 28 months to complete (or a little over nine quarters). The longest reported projects were estimated at five years; these may have been BPR projects.

The most date-reliant industries lead the way in undertaking year 2000 projects. All CIOs from investment houses indicated that their companies had finished the year 2000 project, started the project, or had no changes to make in the first place. In the insurance companies and banks represented, 98.3% and 92.9% of respondents, respectively, made the same indications as the investment houses.

Among the industries surveyed, the communications industry stood out as the biggest procrastinator regarding the year 2000 project: 16.2% reported they had yet to start as of September 1996. Utilities companies were also hesitant: 10% hadn't started at the time of this survey.

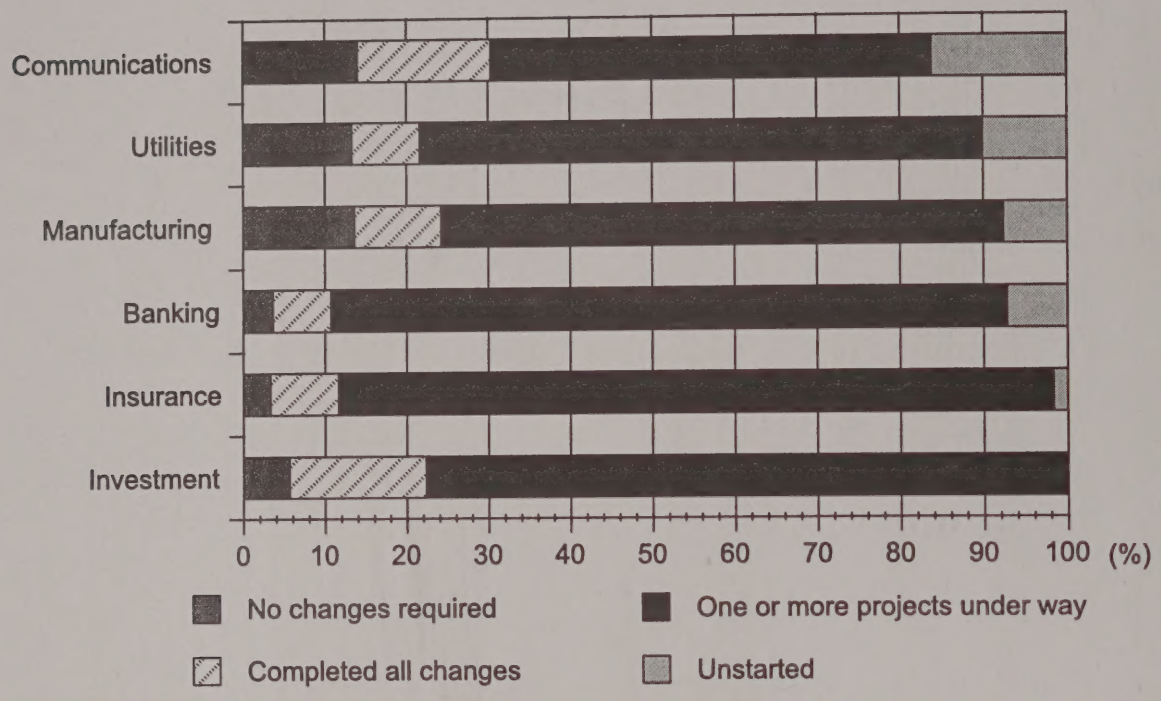
When asked, "When do you expect to complete the needed changes for full year 2000 compliance?" IS executives suggested only 2.8% will not meet the January 1, 2000, date, a far smaller percentage than

CODE RENOVATION VS. BPR TO SOLVE THE YEAR 2000 PROBLEM: THE INSURANCE INDUSTRY EXAMPLE


Business Process
Sale of a policy
Staff handles transmittal and prepares application
Underwriter reviews application
Issuer prepares policy
Administration files new policy
Code Renovation
Salesman submits transmittal form to the applications preparation department
Data entry staff enter application into mainframe
Underwriter reviews application
Issuer prints policy from data in mainframe
Policy data is stored
New year 2000 code recognizes date
New year 2000 code recognizes date
New year 2000 code recognizes date
New year 2000 code recognizes date
Business Process Reengineering
Policy goes straight to administration
Salesman submits electronic transmittal in template form
Underwriter reviews and issues policy
Template eliminates paperwork and accounts for date problems
Word processing software eliminates paperwork
Year 2000-compliant date info is stored in database or server

Source: International Data Corporation, 1997

CURRENT STATUS OF OVERALL YEAR 2000 PROJECTS BY INDUSTRY



Source: IDC's *1996 Y2K Survey of Executives*

many press articles predict. Consequently, one must be cautious in taking these results at face value.

Forecasts on project completion dates have been a traditional butt of IS humor, so it seemed logical for our survey to ask a direct question about respondents' confidence level regarding these completion date estimates. Not surprisingly, executives who reported they had completed the project were highly confident that they would meet their date, so we excluded them. For projects still in process, 62% believed with a 90% confidence factor or higher that they would meet the planned completion date. Less than 7% of all respondents had a confidence factor below 75%.

IDC's survey shows 1998 as the big year for completion of Y2K efforts, with 47.5% of all companies becoming fully compliant. IDC notes that this schedule allows for some slippage in completion dates for most companies. Even for companies not scheduled for completion until 1999 (15.4%), one-half will be complete by July and two-thirds will be complete before October, allowing some room for slippage even at that late date.

IDC does not think the respondents are taking slippage into account when they give their estimates for completion, but we do think the projects will be completed before the deadlines, for several reasons. Because the project can have resounding implications throughout the company, CIOs will assign their top staff and resources to the task. Their careers may depend on it. On the same token, outside contractors will bring the project in on time; they won't stand a chance to establish follow-on relationships with their year 2000 customers if they don't.

In the worst-case scenario for project slippage, IDC estimates 10% of projects will not be complete by January 1, 2000.

OPPORTUNITIES FOR VENDORS

The major concerns CIOs have are assigning sufficient qualified staff to the project and, despite their expected completion dates, finishing the project on time. These problems lead IS executives to services vendors for additional support.

IDC estimates total U.S. spending on year 2000 projects will be $115 billion, accounting for project slippage. Of this spending, $46 billion will go to third-party services, software, and hardware providers.

Of the $46 billion in added spending, services providers will garner about $33 billion, software providers will take $11.4 billion, and hardware providers will take about $1.5 billion. However, some of the money spent on year 2000 issues in these markets will come from money budgeted for development projects. Corporations will be forced to defer the money budgeted for development or not spend this money at all during the next two years.

As reflected in the numbers above and the fact that assigning staff and finishing the project on time are still significant concerns for many of the CIOs who responded to IDC's survey, services providers have the most to gain from the year 2000 problem. Respondents from midsize corporations ($500 million to $1 billion) and respondents from banks led the call for services vendors; more than 70% of both groups declared a need for external services help.

The greatest demand is for programming resources. IS managers have created their year 2000 plans based on reasonable assumptions for available resources. Their assumptions call for outside firms to augment their internal programming resources. IDC believes services firms may have difficulty meeting this demand, placing more pressure on companies to switch resources away from further development projects.

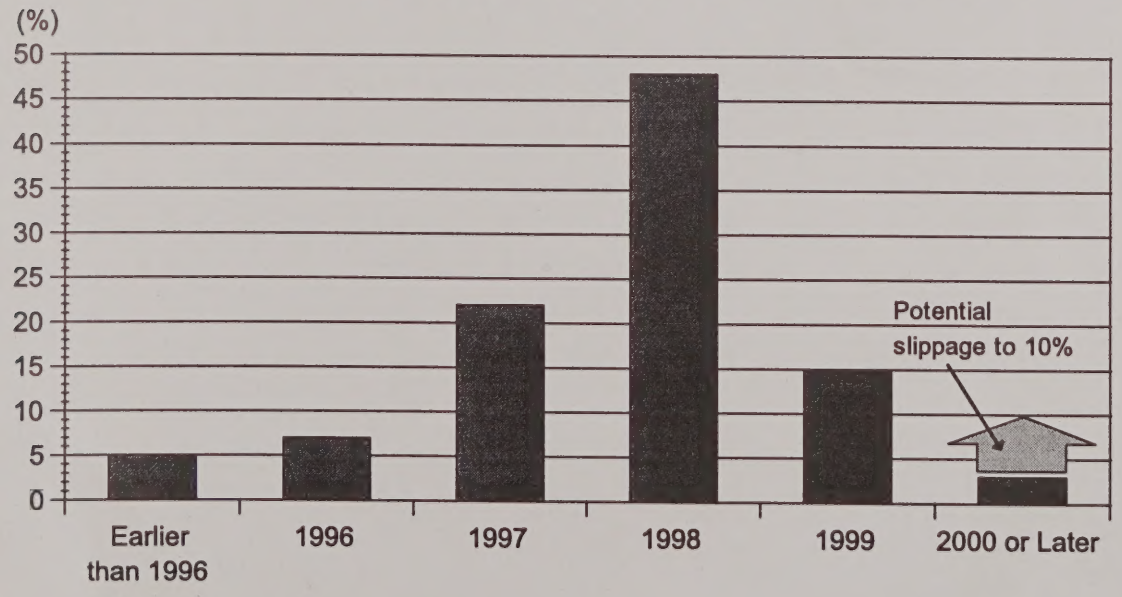
Within the vertical industries, IDC notes two distinct opportunities. Because of its late start in addressing the year 2000 problem, the communications industry represents a wealth of opportunity for third-party vendors (although only 42% of communications respondents indicated an appetite for services contractors). The manufacturing industry, although not as late to address the issue as the communications industry, also represents a great opportunity because of its sheer size.

Delivery Dilemma

Vendors are suffering from the lack of programmers, just as their customers are. Not only are they missing opportunities to win contracts — in some cases, they run the risk of alienating present customers.

Vendors such as IBM and Unisys have elected to protect their installed bases, focusing on their top customers first and leaving smaller accounts to find

Scheduled Completion Date for Year 2000 Projects



Note: IDC estimates that in the worst case of project slippage, about 10% of projects will be incomplete by 2000.
Source: IDC's *1996 Y2K Survey of Executives*

their own solutions to the year 2000 problem. Although companies such as IBM are trying to increase staff as much as possible in effort to extend service to their smaller customers, IDC believes they will be hard pressed to do so.

Even if year 2000 solutions providers do hire additional programmers, the staffing shortage is not likely to be solved. New hires will probably come from the very companies that services vendors are trying to attend to. In other words, the year 2000 programming shortage is a zero-sum game, and solutions vendors are robbing Peter to pay Paul.

Services vendors that don't have an installed base to attend to are enjoying the staff shortage the most. They can look for the "most buck for their bang" by offering their help at a premium.

Note: Some numbers in this document may not be exact due to rounding.

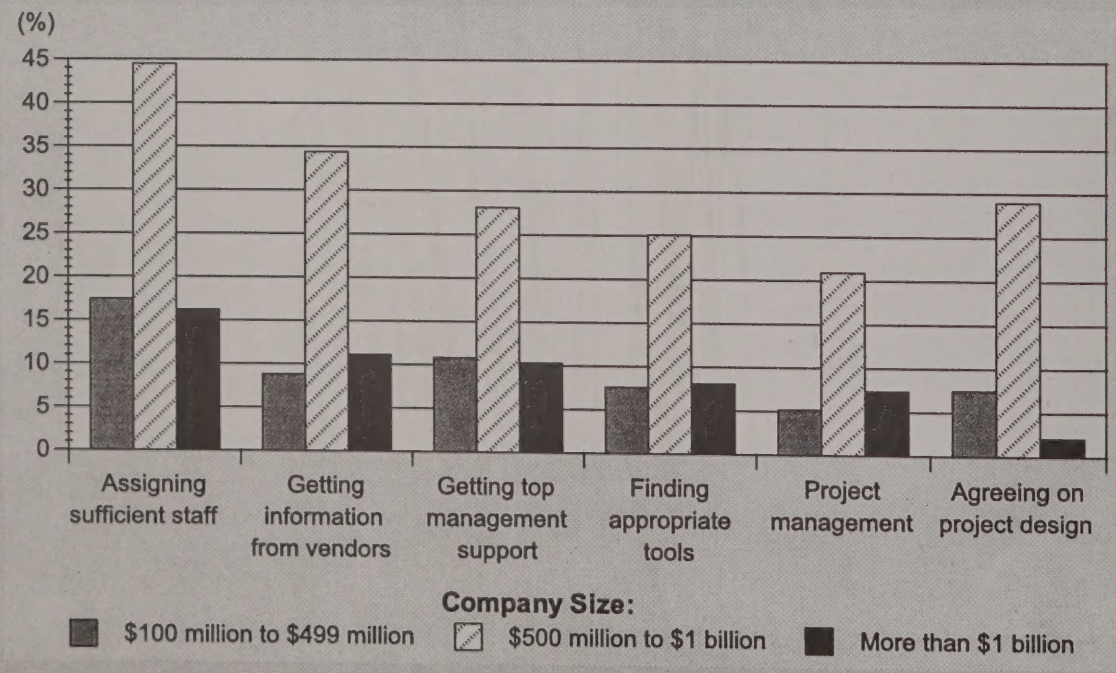
MIDSIZE CORPORATION DILEMMA

Companies IDC rated as midsize ($500 million to $1 billion) in its *1996 Y2K Survey of Executives* seemed to have problems in more areas of the year 2000 issue than did smaller and larger organizations.

Respondents from midsize companies responded that they had a harder time assigning sufficient staff (44.5%) than did smaller (17.4%) and larger (16.2%) companies. IS executives in midsize companies also expressed trouble gaining top management support (28.1%). Other problems disproportionately present in midrange companies included project management and agreement on project design.

IDC believes midrange companies in the *Y2K Survey* are susceptible to these problems for the simple reason that they are big but not big enough. Forward-thinking decision makers in midsize companies are building infrastructures to allow growth to the "large" corporation level, but midsize companies don't have the revenue streams or staff to support such large undertakings. Small companies don't share the infrastructure limitations of midsize companies because their systems are newer and easier to modify.

PROBLEMS WITH YEAR 2000 PROJECTS BY COMPANY SIZE



Source: IDC's *1996 Y2K Survey of Executives*